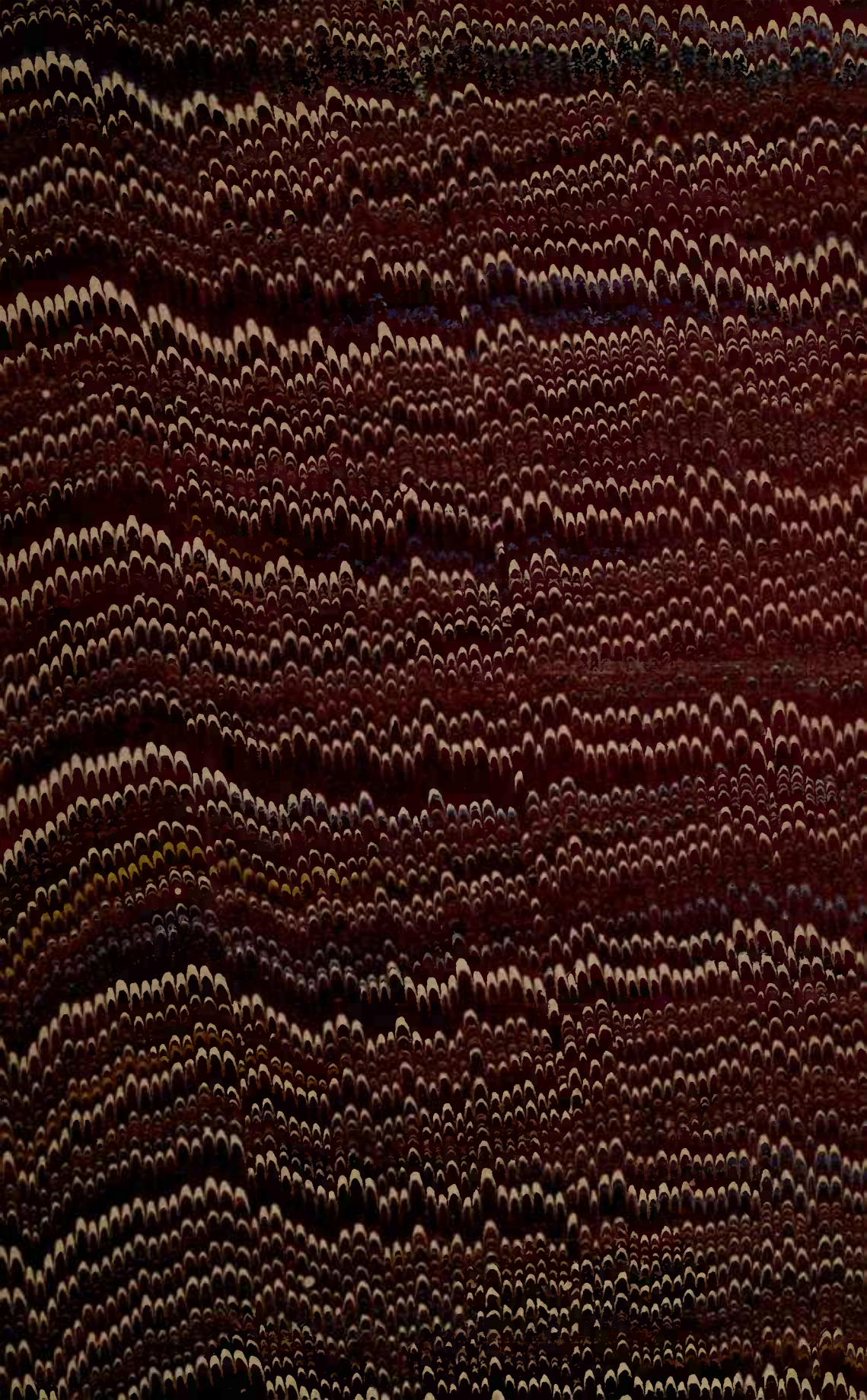
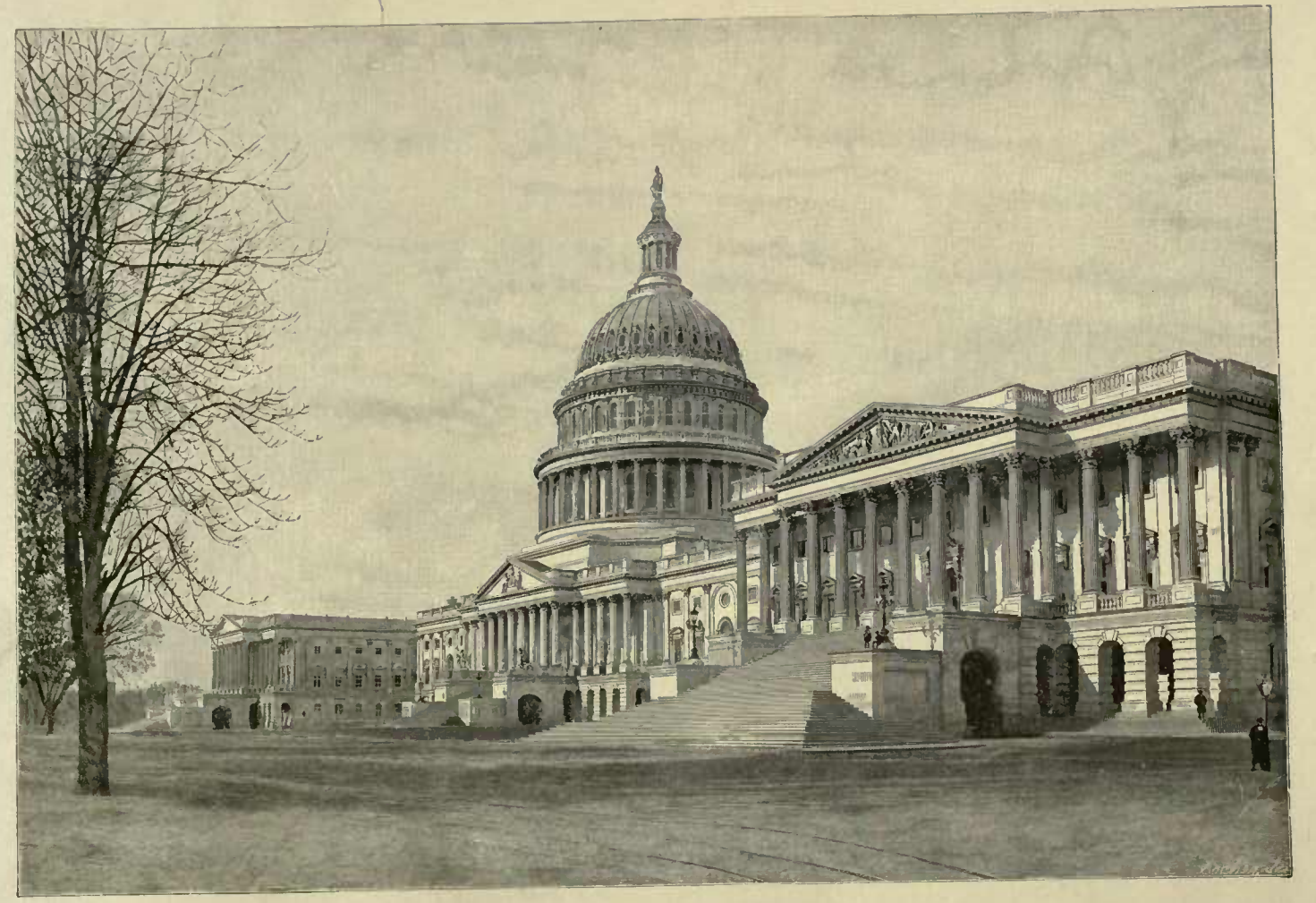
HIC EST LIBER MEUS,
TESTES EST DEUS;
SI QUIS ME QUERIT,
HIC NOMEN ERIT.

A. J. Murray M.S.D.





THE CAPITOL, WASHINGTON, VIEWED FROM THE EAST.

THE

EARTH AND ITS INHABITANTS.

NORTH AMERICA.

BY

ÉLISÉE RECLUS.

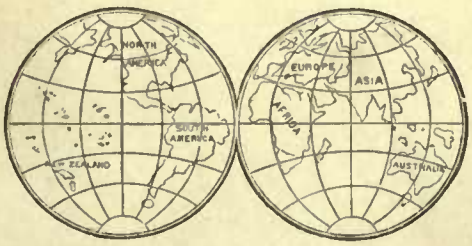
EDITED BY

A. H. KEANE, B. A.,

MEMBER OF COUNCIL, ANTHROP. INSTITUTE; COR. MEMB. ITALIAN AND WASHINGTON ANTHROP. SOC.;
AUTHOR OF "ASIA," ETC.

VOL. III.

THE UNITED STATES.



ILLUSTRATED BY NUMEROUS ENGRAVINGS AND MAPS.

NEW YORK:
D. APPLETON AND COMPANY,
1, 3, AND 5 BOND STREET.
1893.

CONTENTS.

LIST OF ILLUSTRATIONS.

MAPS PRINTED IN COLOURS.

PLATES.

LIST OF ILLUSTRATIONS.

THE EARTH AND ITS INHABITANTS.

THE UNITED STATES.

CHAPTER I.

GENERAL SURVEY.

EXTENT, PHYSICAL CONFORMATION, NATURAL DIVISIONS.

THE section of North America comprised between the Dominion of Canada on the north and Mexico on the south-west neither has, nor could have, any special geographical name, for with the conterminous regions it constitutes an indivisible physical whole. Even the purely political expression, "United States of America," by which it is indicated, might also be claimed by Mexico, or any of the other groups of federal states, though they are all so immeasurably surpassed by the Anglo-Saxon republic in all the elements of national greatness that such a claim on their part could scarcely be taken seriously.

In common parlance the whole territory is simply designated as the "United States," as if there were no other powers to which such a title might also be applied. Nor is there any danger of possible confusion between the United States, so called in a pre-eminent sense, and whatever analogous confederations may exist in the rest of the world. Their extent, population, enterprising spirit and material progress place *the United States* on such a lofty pedestal that the use of this term can give rise to no misunderstandings. The word "America" itself, employed alone without any special qualification, is also perfectly understood from New York to San Francisco, and even throughout the Dominion of Canada, as applied in this exclusive sense to the great English-speaking commonwealth. That the other inhabitants of the twin continent have an equal right to be regarded as citizens of the New World is not even present in the mind of the speaker. The citizen of the United States calls himself "American," as if his "manifest destiny" were to

absorb the whole continent, and he would be greatly surprised were the Canadian, the Mexican, or the Guatemalan to assume the same title in conversing together.

During the short period of little more than a century since they have taken their place amongst independent nations, the Americans have enlarged their bounds so greatly that the name of the land has been successively applied to geographical spaces varying enormously in extent. In 1776, when the revolted provinces proclaimed their independence of the mother country, the "United States," then numbering thirteen, from New Hampshire to Georgia, were mainly confined to the Atlantic seaboard, stretching westwards beyond the Appalachian range only to the shores of Lakes Erie and Ontario and to the wooded banks of the Ohio. The struggle was almost exclusively restricted to the part of the maritime lands comprised between Massachusetts Bay and the entrance to Chesapeake Bay. The territory of the new power might at that time have been estimated at 370,000 square miles, less than one-eighth of its present extent exclusive of Alaska.

In 1783, the treaty of peace which recognised the independence of the United States also considerably increased the area of the region detached from the British Colonial empire, for the cession comprised not only the domain already occupied by the whites, but also several western tracts still held by the prairie Indians. On the north the official limit was made to coincide with the river Saint-Croix, which still marks the frontier between New Brunswick and the North American republic. Southwards the maritime zone surrendered by Great Britain was bounded by the two Floridas, at that time still belonging to Spain.

But beyond the points specially determined by the treaty, the frontiers of the circumscribed territory remained in places very uncertain. Thus the line of demarcation towards the Canadian provinces that had remained loyal to the British Crown could not yet be traced along its entire length, because it traversed regions that had not been thoroughly explored. Nevertheless, it was understood that this line beyond Lake Superior and Lake of the Woods reached the Mississippi at some point below its source. In accordance with this hypothesis it had been agreed that the course of this river should form the western boundary of the United States as far as 31° north latitude, that is, as far as Louisiana. The space thus ceded by England comprised about 447,000 square miles; in other words it more than doubled the extent of territory actually occupied by the colonists.

In 1803 the territorial domain of the United States was a second time doubled by the cession of Louisiana, which the French Government agreed to surrender for the sum of 16,000,000 dollars. Under this name of "Louisiana," however, the two contracting parties understood an indefinite space without precise limits. In fact, the expression was applied in a general way to the whole of the Mississippi slope west of the main stream.

Despite the antiquity of her rights of occupation, and the base of operations afforded by the possession of the neighbouring island of Cuba, Spain also had to yield to the same political necessity, and in 1819 surrendered the peninsula of Florida for 5,000,000 dollars. Henceforth the North American republic embraced all the northern seaboard of the Gulf of Mexico east of the Sabine.

The interpretation of the treaties concluded with Great Britain contributed in their turn to the expansion of United States territory. Of the two rival powers the fates could not fail to favour the one whose domain increases, so to say, spontaneously by colonisation and which needs only to wait for the "accomplished facts" which are sure to tell on her side. Thus in 1842 the northern boundary of the American state of Maine was made to include the upper St. John basin, which according to the English view was certainly left to Canada by the terms of the original treaties.

Again in 1846 the frontier which by the treaty of 1783 had been laid down as far as the central depression of the continent, and which in 1818 had been defined from the Lake of the Woods in a straight line along 49° north latitude to the Rocky Mountains, was continued along this parallel all the way to the Pacific Ocean. The United States thus acquired the lower course of the Columbia River and the whole of the Snake River basin, although these lands had been discovered by Canadian trappers in the service of the fur companies, which were afterwards merged with the great Hudson Bay Company, and although Vancouver had taken formal possession of all the seaboard in the name of England after having surveyed Juan de Fuca Strait and Puget Sound. On the other hand the dangerous bar that obstructs the mouth of the Columbia, which had already been surveyed by the Spanish navigator, Heceta, in 1775, had been first crossed in 1792 by Gray, a Boston skipper flying the American flag. He also gave the name of Columbia to this river, which had previously figured on the maps as the San Roque. The negotiations ended by the surrender of this disputed territory by the British diplomatists.

There remained only the doubtful point regarding the little San Juan Archipelago, which lies between the British island of Vancouver and the mainland. This also was settled in favour of the United States in 1872 by the Emperor of Germany, to whose decision the question had been referred.

Far more important, both in the extent and value of the annexed regions, have been the encroachments of the North American republic on the domain of her southern neighbour, the Mexican Confederacy. A first slice had been appropriated in 1835, when the vast territory of Texas was detached and constituted an independent commonwealth by the American planters who had settled in the country with their slaves. Ten years later they contrived to get their state annexed to the American Union, and the two conterminous republics became involved in war by this substitution of the American for the Mexican suzerainty.

The disparity of forces was too great for Mexico to hold out any length of time, and in 1848 the treaty of Guadalupe Hidalgo secured to the United States the possession of New Mexico, of the Colorado basin, the Utah plateau, and California.

Even this vast acquisition, the value of which was unknown to the conquerors themselves, but which gave them over 800 miles of frontage to the Pacific Ocean, did not seem enough, and five years later they purchased another strip of Mexican territory south of the river Gila, on the ground that it was indis-

pensable for the construction of a future railway. In point of fact, one of the United States transcontinental lines actually traverses this tract, which was at first known as "Gadsden" from the name of its purchaser, or of Masilla from one of its western districts; later it was divided between Arizona and New Mexico.

Since these vast acquisitions on the Mexican frontier the United States have made no further encroachments on the conterminous northern and southern lands; nor have they annexed any of the West Indies, which had been assigned to them by so many false prophets. But at the north-west extremity of the continent

Fig. 1.—Successive Growth of the United States.

Scale 1 : 75,000,000.

their territorial empire was increased by the purchase of the immense but at the time almost unknown region of Alaska, in 1867. This outlying Russian possession, formerly known as Russian America, was sold to the States by its master, the Czar of all the Russias, for the sum of 7,200,000 dollars.

Hitherto the occupation of this boundlesss region of forests, mountains, tundras, ice and snows, has been of no economic importance. But in the eyes of many politicians the sale of Alaska has been regarded as a recognition on Russia's part of the principle of United States suzerainty over the American continent, and especially as a hint to Great Britain, still suzerain of Canada.

Alaska adds about an additional 577,000 square miles to the domain of the United States, the central mass of which forms a vast quadrilateral, comprised between the two oceans east and west, Canada on the north, the Mexican Gulf and plateau on the south. Within these limits the republic comprises a superficial area of 3,026,000, and, including Alaska and the American portion of the Great Lakes, of 3,668,000 square miles, or more than thirty times that of the British Isles, more than five-sixths of Europe, and the sixteenth part of all the dry land on the surface of the globe.

Subjoined is a table of the growth of United States territory, with approximate estimates of its extent at various dates:—

	Area in sq. miles.
The original colonies (exclusive of the trans-Alleghany lands)	370,000
Territory ceded by Great Britain in 1783 (exclusive of Great Lakes)	447,000
Louisiana, bought from France in 1803	922,000
Florida, bought from Spain in 1819	59,000
North Maine, ceded by England in 1842	10,000
Oregon Territory, ceded by England in 1846	250,000
Texas, annexed in 1845	376,000
New Mexico, Arizona, Utah, and California, ceded by Mexico in 1848	546,000
The Gadsden purchase from Mexico in 1853	45,000
Alaska, bought from Russia in 1867	577,000
San Juan Archipelago, ceded by England in 1872	600
Total (exclusive American portion of Great Lakes)	3,602,600

Geographical Exploration—Surveys—Cartography.

What is now true of Alaska is equally true of the United States as a whole, that the peaceful or enforced annexation of the various regions constituting the republic was made long before those regions were explored, or even known in their more salient geographical features. Hence great efforts were needed to place this section of North America on a level with Europe as regards the scientific study of its soil and climate. To fully appreciate the results already achieved, it should be remembered that ten generations have not yet passed since the first civilised whites established themselves on the lands that now form the inheritance of the American republic.

Doubtless the Norse navigators in the year 1000 coasted the shores of Vinland ("Wineland"), a region which, by Rafn, Zohl, D'Avezac and other early commentators, has been identified with the present Massachusetts, and which, in any case, must have been situated somewhere south of the St. Lawrence. Other visits probably followed this discovery; but the records of those times are too interwoven with legendary matter to yield any clear or certain evidence to the historical student. The existence of Vinland's wooded and inhabited seaboard is the only geographical fact placed beyond all doubt by the Norse mariners.

The first explorations along the shores and in the territory of the present United States, after the decisive discoveries of Columbus, Cabot and the other pioneers, had at least the immense advantage of giving substance to the vague visions of contemporary geographers. But our knowledge of those expeditions is too summary, and the names of places are too difficult of identification, to enable us now to trace the itineraries with accuracy.

The explorations conducted by Ponce de Leon, Vasquez de Ayllon, Pamphilo de Narvaez in Florida, and afterwards by De Soto and Moscoso as far as the Mississippi, followed pathless and now unknown tracks across forests, swamps and prairies. From the general description of the country it can be alone inferred that the Mississippi was crossed near the spot where at present stands the little town of Helena, north of the point where the White and the Arkansas rivers join its mighty current.

At least as early as the year 1542 the western shores of the region now known by the name of California had been surveyed by Cabrillo as far as Cape

Fig 2.—New England Seaboard according to Lucini (1631 ?).

Mendocino, and the temperate lands of North America henceforth figured on charts and maps with contour lines differing little from the reality. The essential geographical feature of the interior of the continent was traced by the early French explorers, who ascended the chain of the Great Lakes from the St. Lawrence, and then followed the course of the Mississippi down to its mouth in the Gulf of Mexico. Towards the close of the seventeenth century were drawn the first maps, on which is roughly sketched the central hydrographic system of North America. The districts near the French settlements along the St. Lawrence are figured in far greater detail and accuracy on the charts prepared by contemporary land surveyors. Thus the map of Lake Champlain drawn by Anger in 1748 is scarcely

THE HIGH PLATEAU REGION OF UTAH—THE PINK CLIFFS AND THE UPPER VALLEY OF THE VIRGIN.

inferior to those of the same region and on the same scale which are at present issued. The settlement of the Atlantic maritime districts by English and Dutch colonists also contributed to a continually increasing and more accurate knowledge of the outlines of the seaboard, as well as of the geographical features of the coastlands as far inland as the ranges belonging to the Appalachian system. In the year 1642 the Massachusetts government commissioned two "mathematicians" to lay down the frontiers of the territory that had been assigned to that colony.

Then the warlike expeditions against the French and their Indian allies opened up the regions beyond the mountains as far as the Great Lakes. But geographical knowledge advanced by leaps and bounds after the close of the War of Independence, when the rapid progress of colonisation in the Ohio valley, and generally westwards to the Mississippi, necessitated a vast system of surveying operations, the results of which were soon embodied in outline maps.

At the beginning of the present century the Americans, already masters of the boundless territories comprised under the designation of Louisiana, extended their settlements and their explorations far beyond the Great River. In 1804, Lewis and Clarke, carrying out an enterprise projected thirty years previously by Carver and Whitworth, ascended to the region about the headwaters of the Missouri, crossed the passes over the Rocky Mountains, and, descending into the basin of the Columbia, followed that river to its mouth, which had already been discovered by Gray twelve years previously.

In the exploration of the Far West, Lewis and Clarke found numerous successors, and towards the middle of the present century the orographic system of those rugged, storm-swept regions was revealed in its fundamental outlines. Between the years 1842 and 1846, Fremont, from whom one of the loftiest peaks of the Rocky Mountains has been named, explored numerous passes in the Rocky Mountains between the Colorado and Columbia rivers, while Stanley devoted himself specially to the Utah plateau with its saline lakes and deserts.

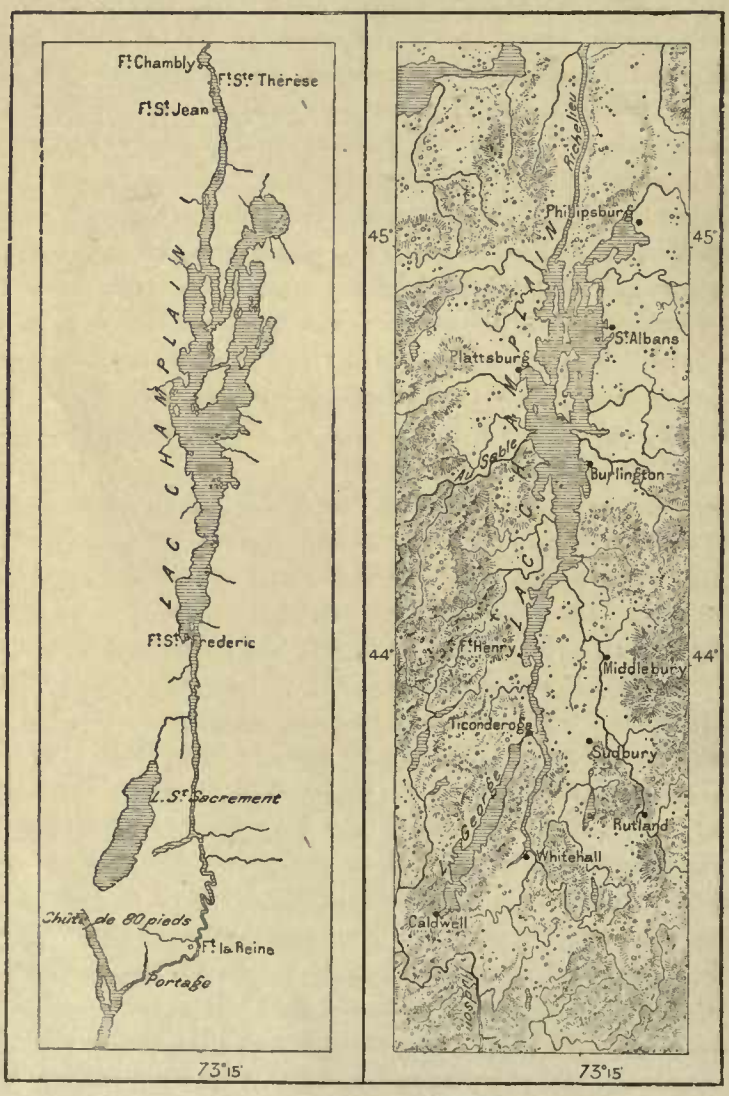
But the systematic study of the country was first undertaken after the Mexican war and the cession of California to the United States. Eager to survey the vast expanses of which they had become the fortunate possessors, the Americans organised scientific expeditions as early as the year 1853, for the purpose of discovering the best routes for a transcontinental railway; with these explorations, whose object was mainly economical, were naturally associated scientific studies on the geology, hydrography, natural history, fossils, antiquities of the surrounding regions, as well as of the local tribes and their migrations.

This immense work of exploration throughout all the lands beyond the Mississippi, and especially west of the meridian of 100° west longitude, has been carried on at great expense by the various scientific departments attached to the departments of war and of the interior, and by the agents of the Smithsonian Institution. Moreover, a general Geological Survey of the United States has grown out of a geological and geographical survey of the west, which began its operations in 1867 with the study of the recently organised state of Nebraska. Despite differences between the material organisation and the staff of officials, despite a certain friction

between the departmental officers and the men engaged in conducting the practical work, the operations have been none the less continued as a whole, and have given birth to a prodigious collection of documents methodically classified and undoubtedly forming the richest special library in the world. Associated with this vast under-

Figs. 3 and 4.—Lake Champlain, according to Anger and Colvin.

Scale 1 : 2,000,000.



taking are the names of Whipple, Marcou, Emory, Hayden, Meek, Leidy, Wheeler, Gilbert, King, Emmons, Hague, Powell, who have here found the widest field for their activity. The general map of the trans-Mississippi regions on a scale of 1 : 253,440, in 143 sheets, each subdivided into four parts, is more than half finished, and contains a summary of thousands of explorations in the Far West.

Moreover, innumerable maps in greater detail and on various scales have been and are being added from year to year to the existing collections.

Although the states east of the Mississippi have been occupied by the white man from a date far anterior to that of the colonisation of the western territories, their topographic survey in a manner comparable to that of the regions beyond the Mississippi has been postponed to a much later period. The first attempt made to obtain the exact measurement of a degree of latitude took place towards the middle of the eighteenth century in connection with a dispute about frontiers. An agreement concluded between Pennsylvania and Maryland had stipulated that the dividing line, beginning twelve miles north-west of Newcastle, should run due west across five degrees of longitude.

The geometricians charged with this operation were not sufficiently instructed for such work, and after long essays, all followed by failure, they had to give up the task. Appeal was then made to Mason and Dixon, two Englishmen, who accomplished the undertaking. But the wrong measurements previously taken had already vitiated the operations in principle, and numerous errors were detected in its execution. The boundary laid down by the two surveyors became famous under the name of "Mason and Dixon's line," because later it indicated the frontier between the Northern and Southern States, that is to say, between the free and slave states. It is from this circumstance that in popular language the Southern States are often referred to as "Dixie's Land."

Crude surveys made during the course of the eighteenth and the first half of the nineteenth century, for the purpose of determining the boundaries of various states, or of counties within the states, also frequently gave rise to some very questionable results, the members of the surveys taking no account of the convergence of the meridional lines, and for the most part confusing the true with the magnetic north pole. Thus the dividing line between Virginia and North Carolina, and between Kentucky and Tennessee, which extends westwards for a distance of twelve degrees of longitude, was assumed to coincide with 36° 30′ north latitude, whereas subsequent surveys have shown that it oscillates between 36° 31′ and 36° 36′.

But such errors led to no serious consequences, maps being at that time used almost exclusively for the purpose of establishing the political and administrative divisions between states and counties, and to determine the limits of domains held by private landowners. Most of the so-called "maps" merely contained the summary results of the surveying sheets, representing the conventional divisions of the land in broad highly-coloured lines, regardless of broken or level surfaces, vertical relief, water-partings or fluvial basins. Nevertheless, it must be admitted that the magnetic chart of the United States has been the object of more serious studies and of more thorough operations than that of Europe.

Such was the dearth of serious topographic surveys before the Civil War that Massachusetts, representing not more than the 441st part of the whole republic, was the only state which at that time possessed a map comparable to the topographic works of West Europe. But "the interests of trade and

defence" urgently demanded that at least the coasts should be determined by accurate geodetic surveys, and this work, which at first was confined to the detailed representation of the more frequented ports and roadsteads, gradually acquired sufficient importance to serve as a base for the cartography of the whole country. In fact, the staff of the "Coast and Geodetic Survey" has already nearly completed a minutely accurate survey of the seaboard along both oceans and around the Gulf of Mexico. It has, moreover, studied the regime of many of the watercourses as far as the head of navigation, and connected the triangulation of the seaboard with that of the mountain ranges. It is even carrying the chain of triangles inland towards the Rocky Mountains, in order to form a junction of the surveys in the western slope with those of the Atlantic coast at 39° north latitude.

After the successful development of this great work, there could be no thought of shrinking from another vast undertaking, that of preparing a systematic chart of the United States on scales large enough to represent topographic details. This comprehensive scheme was taken in hand by the Geological Survey in 1884, without neglecting its primary object, which is to prepare the geological map of the country.

About three hundred sheets issued before the end of 1891 give some idea of the colossal character of this undertaking, which is already completed in thirty-six sheets for New Jersey, in sixty for Massachusetts, and in four for the Yellowstone National Park; a beginning has also been made in nearly every state of the Union.

The scale of the general map of the United States varies with the different regions, rising from 62,500 for the more populous eastern provinces to 125,000 for most of the other States, and 250,000 for mountainous regions. The number of sheets would exceed a hundred thousand were the whole national domain treated with the same detail as Massachusetts and the other Atlantic states.

The plates already published by the Geological Survey are of very fine appearance, and represent the altitudes very neatly by means of levelling lines traced at intervals of a hundred English feet. But compared with similar sheets published in Europe they reveal a surprising poverty in local names. The geographical nomenclature of the United States is, in fact, extremely defective, or, rather, it has still to be formulated. Nor could it be otherwise in a country which since prehistoric times had been but sparsely peopled, and in which it was impossible to hand on the intellectual culture of the first inhabitants to the present masters of the land.

In Italy, France, and Great Britain the names given to localities thousands of years ago still survive either in their first form, of which the sense is not always lost, or under some new or modified form, in harmony with the new or modified languages. Many of these names were doubtless forgotten during the long succession of ages; but they have been successively replaced by others drawn either from the aspect of the land, or from the nature of the soil, or else from some historic event or local incident, all arising spontaneously from the current speech of the time.

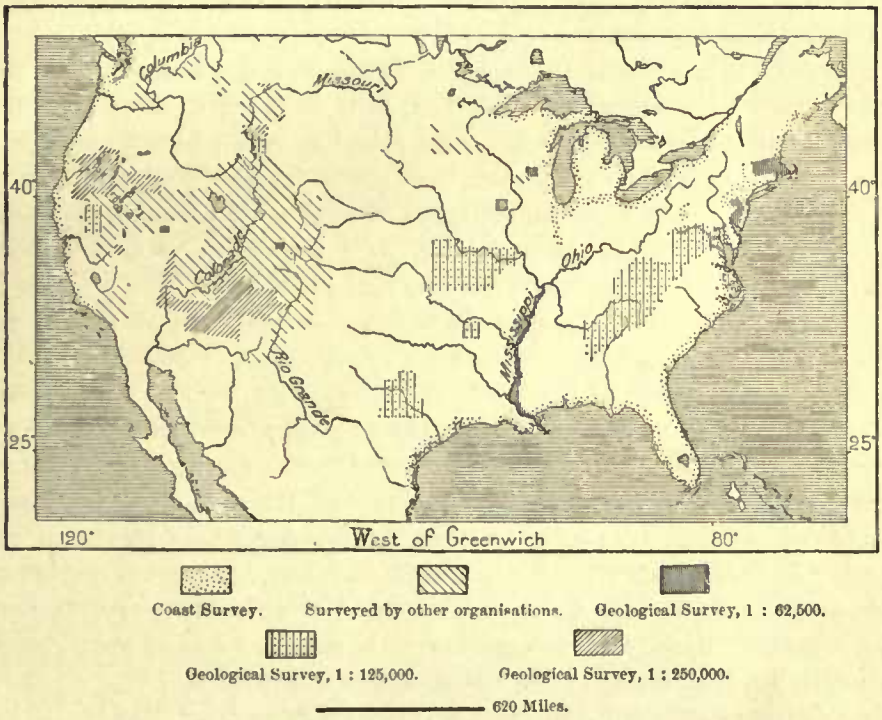
In the United States the conditions are different. A few Indian names, for the most part greatly mutilated, have been preserved, either because of their

euphonious sound, or when understood thanks to the poetry and appropriateness of the expression, or in certain cases in virtue of the imposing aspect of the sites, or of the fame acquired far and wide by their Indian designation. By a remarkable contrast, most of the terms belonging to the American languages have been retained, not in the Far West, but in the Atlantic coastlands, which have been longest settled by the whites, and consequently the longest cleared of the aboriginal populations. Moreover, hundreds of such Indian terms in New England and the State of New York are still traditionally known or recorded by the early writers, though now replaced in the current speech by English names.

The reason of this rich inheritance is simple enough. During the early days

Fig. 5.—Present State of United States Topography.

Scale 1 : 45,000,000.



of the colonisation, the Europeans, still relatively weak, were in constant association with their neighbours, the Redskins. They had to traffic with them, take them as guides through the western forests, sign treaties and conventions in their wigwams, learn to smoke the calumet of peace, while awaiting the day when they should be strong enough to exterminate or drive them into the interior, and reduce the few survivors to the condition of abject slaves. During over two hundred years of peaceful or hostile contact the white settlers had time to learn a great part of the local nomenclature, and, gradually acquiring some facility in pronouncing those strange names, they had no occasion to replace them by trite expressions borrowed from their own language.

In the western regions, on the contrary, the white invasion was rapid, or even

sudden ; after a few sharp conflicts, the Indians had either to withdraw or allow themselves to be penned up in narrow reserves. The two races had but little intercourse with one another, and the Indian geographical terminology remained almost entirely unknown to the intruders.

It was not through the aborigines, but at least partly through the Canadian voyageurs, French or half-caste, that the immigrants acquired their knowledge of the Far West. Even before being traversed by the Anglo-Saxon pioneers, the regions stretching beyond the Mississippi to the middle of the Rocky Mountains were represented by a map covered with French terms, names of tribes, of mountains, rivers, rocks, and plains. Since the settlement of the land by Americans of English speech, many of these names have persisted, though at times under a strangely distorted form. Thus, the river Cheyenne and Cheyenne City probably recall the presence of an ancient tribe of "Chiens" or Dogs, as they were called by the Canadian trappers.

But the vast majority of the names had to be coined when the bulk of the settlers invaded the western regions. It is not, however, in the power of the human intellect to create a new language spontaneously. The Americans, like their forefathers, could do no more than name the new localities from some physical characteristic, from reminiscences of the mother country, the memory or glorification of persons respected for their wealth, power or influence, or else the prospect of some future moral or material triumph.

But aptly to name all the sites of a region nearly as large as Europe would need an imagination of more than ordinary vividness, a singularly powerful memory, a rare depth of poetic feeling; and even were the new arrivals endowed with these exceptional intellectual resources, frequent repetition would none the less have still been inevitable. Certain rounded crests naturally suggested to the settlers in South Carolina and Ohio alike, such epithets as Round Top or Round Hill ; in the same way heights destitute of vegetation might be called Bald Mountain wherever met, while according to the prevailing growths, eminences would take some designation composed of such words as Pine, Laurel, Oak, Chestnut, Hickory in combination with various forms of relief, such as Mount, Ridge, Hill, Height, Cliff, Ledge, Range and the like.

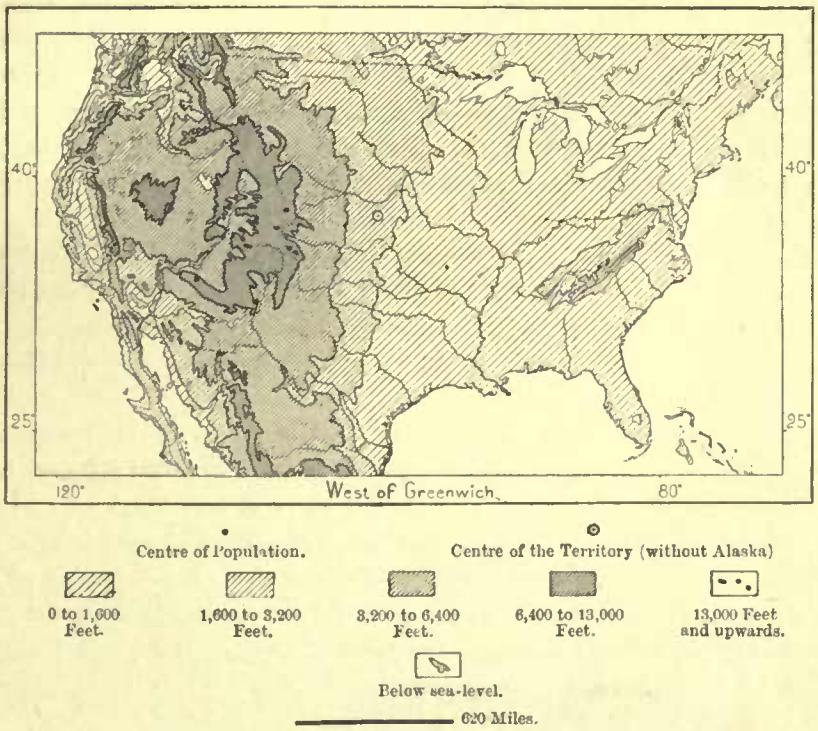
So also every district has its Deep or Flat, Crazy or Lazy, Muddy, Rocky or Sandy River. Every city of the Old World, whether vanished or still flourishing, had its homonym in the New ; hence Babylon and Memphis, Canton and Delhi, Athens and Rome, Troy and Syracuse, Paris and London, some recurring more than once. Patriotic sentiment has often transferred the names of places in the home country to the new foundations, though the anticipations of the first settlers have rarely coincided with the facts, the new towns seldom suggesting in their careers the history of the old places. The Cairo of Illinois resembles the Egyptian Cairo only in its ramifying streams ; Paris is represented by a few insignificant urban groups, and London has no very formidable rival in the trans-Atlantic New London.

On the other hand, the Boston, Baltimore and Orleans of the United States have

outstripped their European homonyms beyond all standard of comparison. The series of names where the commonplace reigns supreme is associated with such popular leaders as Washington, Jefferson, Fayette or Lafayette, Adams and others, whose number is already legion.

The orthography of all this perplexing nomenclature also varies considerably, as shown by a comparison of the English and American texts. In fact, the spelling has not yet been officially established; but here custom decides the question, for it is important to adopt some uniform system in geographical writings. In the present work it has been found necessary to adhere to the usual

Fig. 6.—Zones of Altitude of the United States.
Scale 1 : 48,000,000.



orthography of American documents. Thus *Egg Harbor* appears instead of *Egg-harbour*, *Snow Plow for Snow-plough*, *Boisé City* for *Boisée*, and so on.

Broad Physical Features.

The United States occupy such a large section of the New World that the general description of this vast region coincides almost with that of North America itself. Like the whole continent, the territory of the great republic presents a remarkable simplicity of structure. Broadly speaking, it consists of a vast central plain with a serpentine axis indicated by the course of the Mississippi, and two outer rims represented by the two orographic systems of the Appalachians on the Atlantic and the Rocky Mountains with their attendant plateaux on the Pacific side.

But these two systems are disposed in different directions; while the Appalachian chains run north-east and south-west, the Rocky Mountains have a general trend from north-west to south-east. They also present a marked contrast in their respective dimensions. The vast mountainous plateau comprised between the Rockies and the Sierra Nevada is both far more extensive and far more elevated than the parallel ridges of the Appalachian system. But their geological study shows that these eastern uplands are a mere vestige of what they must once have been. The peninsula of Florida at their southern extremity is of coralline origin, and consequently constitutes a little world apart, or rather belongs physically to the West Indian insular region. Excluding Alaska, the mean altitude of the United States has been estimated by Gannett at 2,500 feet.

To the simplicity of structure corresponds that of the general relief and contour lines. In this respect the United States offer a striking contrast to Europe, whose framework, formed of numerous continental fragments, presents the whole series of geological formations, where the order of succession is far from easily recognised. Compared with this complexity the stratification of the North American continent is characterised by a surprisingly regular arrangement.

The eastern section, which comprises the whole of the Appalachian region with the slope draining to the Great Lakes and the St. Lawrence, consists of primitive rocks and the ascending transitions up to the carboniferous formations. This section may be regarded as the foundation stone of the continent on which were developed the first living organisms.

West of the archaic Appalachian system, and as far as the foot-hills of the Rocky Mountains, secondary formations greatly prevail over all others. Lastly, the westerly section of the States is formed by a vast pedestal of crystalline rocks, cropping out here and there, and generally overlaid by secondary and tertiary strata, the former disposed in parallel chains, the latter consisting of plains and closed basins. Moreover, lava streams of enormous extent occupy the greater part of the north-western territory in the basin of the Columbia, and throughout the Oregon and Californian coast ranges.

Natural and Political Frontiers.

Despite the symmetrical delimitation of the United States frontiers, from Puget Sound to Lake Superior, and from the Californian seaboard to the course of the Rio Grande del Norte, the conventional limits coincide more closely than might be expected with the boundaries traced by nature. Thus on the north-west coast the San Juan de Fuca channel and the archipelagoes of Puget Sound, all belong to the last or southernmost of the long series of north-western coast fjords. North of the political frontier the marine shore-line is carved into numerous sounds and ramifying inlets, and masked by an outer fringe of islands and islets extending all the way to the Alaskan peninsula and the long chain of the Aleutian Archipelago.

But south of that frontier the coast assumes the aspect almost of a straight

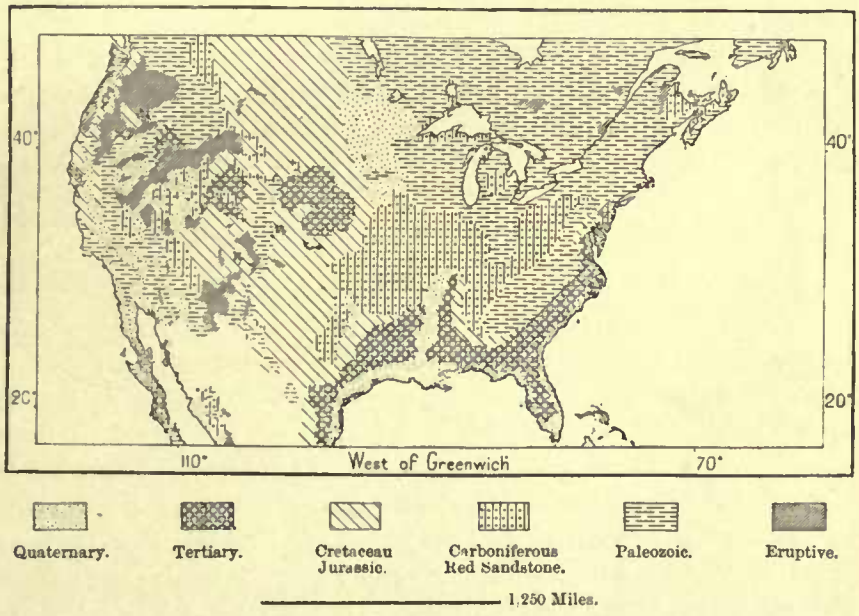
SAN FRANCISCO BAY—VIEW TAKEN FROM THE CITY.

line, or at least is but slightly diversified, presenting scarcely any breaks or indentations. The only inlet piercing the long line of rocky cliffs is San Francisco Bay, forming with its ramifications one of the finest groups of harbours in the world. This bay, however, cannot be regarded as a true fjord like those of the Columbian and Alaskan seaboards, but rather as a simple valley enclosed by parallel ranges and communicating through a narrow breach with the sea.

On the coast of Maine, at the other extremity of the United States, the political frontier coincides less closely with a zone of natural transition. In fact, the whole shore-line is here indented with fjords as distinctly as is the Labrador coast, while the innumerable lakes of the north-eastern United States also belong physically to the Canadian region. Even south of Massachusetts and of the

Fig. 7.—Geological Formations of the United States.

Scale 1 : 65,000,000.



headland of Cape Cod, fashioned like a gondola's prow, the inlets penetrating into the interior of the country are also true fjords now in process of being filled up.

Lastly, Lake George and Lake Champlain, with the tarns of the Adirondack Mountains, and even the Hudson Valley itself, belong originally to the same system of marine fjords. Thus it is only south of New York that the seaboard, here skirted by long cordons of sand or mud, begins to form part of another geological domain. Beyond the valley and estuary of the St. Lawrence, which so sharply intersect the continental seaboard, the most conspicuous natural division on the Atlantic coast of North America is New York Bay. This southern limit of the marine fjord system coincides with that of the lines of moraines borne southwards by the northern glaciers.

Between the north-western and north-eastern angles of the United States,

the great inland seas which send their overflow to the St. Lawrence, form collectively a political and fiscal frontier, whereas, from the standpoint of international relations and general intercourse, these waters form, on the contrary, the chief element of union between the peoples inhabiting their shores. It is in virtue of the chain of lakes which girdle it round that in its economic and social life the Canadian province of Ontario forms an integral part of the same physical region as the States of the Ohio basin.

Hence this lacustrine frontier, which with its contour lines figures so prominently on the maps, is really more artificial than the long conventional line of the forty-ninth parallel between the Lake of the Woods and Puget Sound. The geometrical boundary is at least so far justified by the natural conditions that it leaves to the United States all the upper Mississippi and nearly the whole of the Missouri basin. Moreover, it crosses the Rocky Mountains at a relatively narrow part of the orographic system, where a depression occurs between distinct sections of the range.

On the southern frontier towards Mexico, more than half of the dividing line coincides with the course of the Rio Grande del Norte. The remaining part of the line is drawn so as to award to the United States the whole course of the Rio Gila; it has also the advantage of crossing the peninsula of California near its neck.*

Lacustrine and Marine Waters.—The Seaboard.

To each of the three great geological divisions of the North American domain —Appalachians, Mississippi basin, and Rocky Mountains with their plateaux— correspond different seas. The Atlantic has deposited lands which stretch along the foot of the Alleghanies and their offshoots; the Gulf of Mexico limits the Mississippi slope on the south, while the same slope is bounded on the north and separated from the regions facing the Frozen Ocean by the Canadian Great Lakes, which virtually form another marine gulf, although connected with the ocean by a river instead of a strait. Lastly, on the west side the Pacific waters wash the base of the foot-hills belonging to the Rocky Mountains system.

The very outlines of the seaboards suffice to reveal their various origins. The north-east coastlands, till comparatively recent times covered with an icecap, preserve in a slightly modified form the aspect which they had under the glacial mass. Southwards all the shores of marine formation, as far as the peninsula of Florida, present a series of sandy cordons, which the sea has disposed in front of the

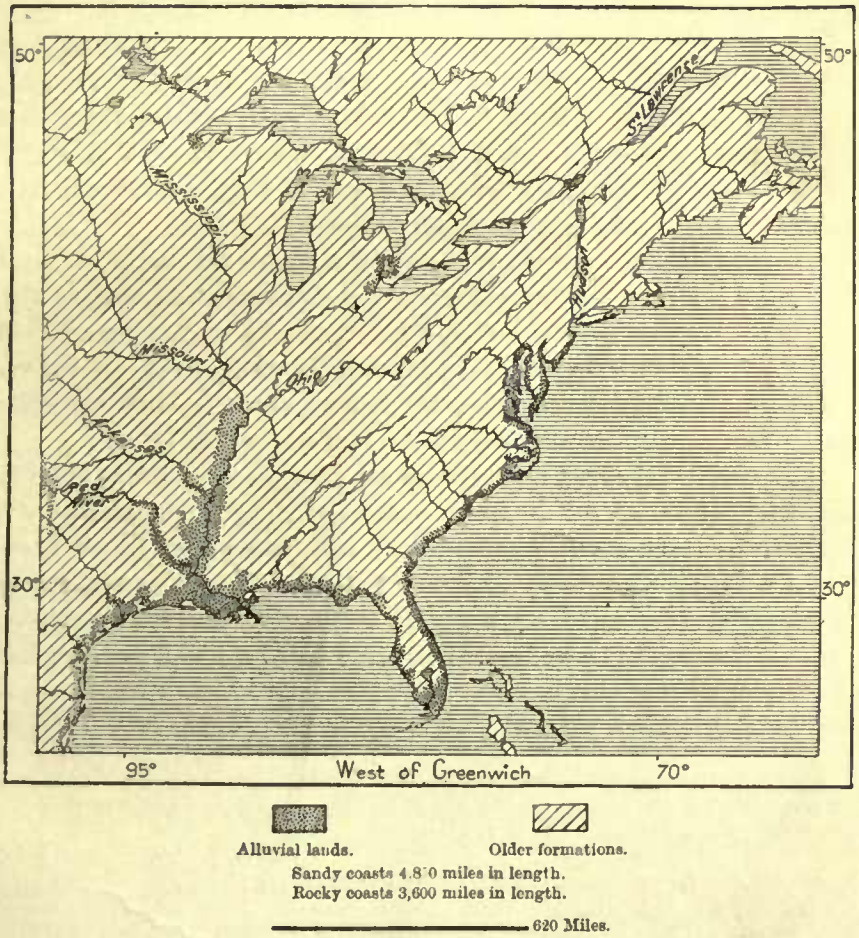
	Square miles.
Area, main, United States (Gannett and Carpenter)	3,025,600
,, Alaska	577,390
,, American portion Great Lakes	65,177
Total area United States	3,668,167
Area dry land, main, United States	2,970,000
,, water ,, ,, ,, except Great Lakes	55,600
	3,025,600
Extreme length United States from east to west	2,875 miles.
,, ,, ,, ,, ,, north to south	1,600 miles.

primitive beach by regularly upheaving the marine bed facing the coast. On the inner side of the terminal mass formed by the peninsula of Florida the southern shores of the United States washed by the Gulf of Mexico present an aspect analogous to that of the Atlantic coastline.

The Pacific seaboard, on the contrary, is rocky throughout nearly its entire extent, or at least the strands formed by the conflicting marine currents develop their curves between rocky headlands.

These differences in the conformation of the seaboards and in the materials

Fig. 8.—North Atlantic and Mexican Gulf Coastlands.
Scale 1 : 30,000,000.



composing them betray the diversity of their geological history, and are associated with the secular phenomena of upheaval and subsidence. According to the observations made at certain points on the coast, the Atlantic shores seem to be gradually sinking and permitting the further encroachment of the sea. Those of the Gulf from Florida to Texas, as well as those facing the Pacific Ocean, would appear, on the contrary, to have entered a period of upheaval. To such upheaval of the land observers are disposed to attribute the position of a marine shell-

mound, which at present lies to the north of Mobile 50 miles inland, but which must evidently have at one time stood on the seashore.

It may be stated in a general way, that the Atlantic coast of the United States, at least south of Chesapeake Bay, is one of those that have been the least favoured by nature as regards the diversity of its contours and the number of commodious havens. The section of the seaboard most easily approached, and possessing the finest harbours facing towards the Old World, has also progressed most rapidly in population, trade, and general prosperity.*

Climatic and Botanical Zones.

Speaking broadly, the United States corresponds with Europe in its climate, although in its mean latitude it lies much farther south. It is comprised between 49° and 25° north, whereas the European continent is limited by 71° and 36°. Thus its mean latitude is indicated by the thirty-seventh parallel, which traverses Virginia, Kentucky and Missouri, while that of Europe is situated over 1,100 miles nearer to the North Pole, passing from south England through Holland, and north Germany, to the central steppes of Russia.

The discrepancy seems enormous, but if we take the two ports of Liverpool and New York, which is true enough from the economic standpoint, as the corresponding cities on either side of the Atlantic, one the converging point of the chief European lines of emigration, the other the diverging point for the various lines of migration radiating throughout the interior of the republic, the difference of latitude between the two great ports is found not to exceed 12° 42′.

The difference in their mean temperatures, also, is but slightly in favour of the city which lies nearer to the torrid zone.† If the summer heats are much higher in the American than in the English city, the winter season is on the other hand always more severe. The influence of the oceanic currents, whether atmospheric or marine, which set normally in the direction from south-west to north-east, both raises and equalises the temperature on the west coasts of Europe. This movement of the winds and waters in an oblique path across the north Atlantic is nothing more nor less than a general translation of the climate of

* Length of the United States coasts measured in a straight line from one extremity to the other (No. 1); and following the contour lines of the shores, islands and navigable estuaries (No. 2); according to a chart prepared to the scale of 1 : 1,000,000.

	No. 1. Miles.	No. 2. Miles.
Atlantic coast from the mouth of the Saint Croix to Key West .	1,700	19,800
Gulf coast from Key West to the mouth of the Rio Grande .	950	9,500
Shores of the Great Lakes from the Thousand Islands to Duluth	800	3,300
Pacific coast from Cape Flattery to the Mexican frontier . .	1,200	3,700
Total . .	4,650	36,300
Rocky coast	15,500 miles.	
Sandy coast	20,800 miles.	

† Annual range of temperature at Liverpool and New York:—

	Liverpool. 53° 24′ N. Lat.	New York. 40° 42′ N. Lat.	Difference.
Mean annual temperature	50° F.	52° F.	2° F.
Mean temperature of July	62°	75°	13°
Mean temperature of January	41°	30°	11°

America towards the higher European latitudes. Hence the extreme importance of the forecastings of approaching storms and cyclones forwarded one or two days in advance by the meteorologists of the New to those of the Old World.

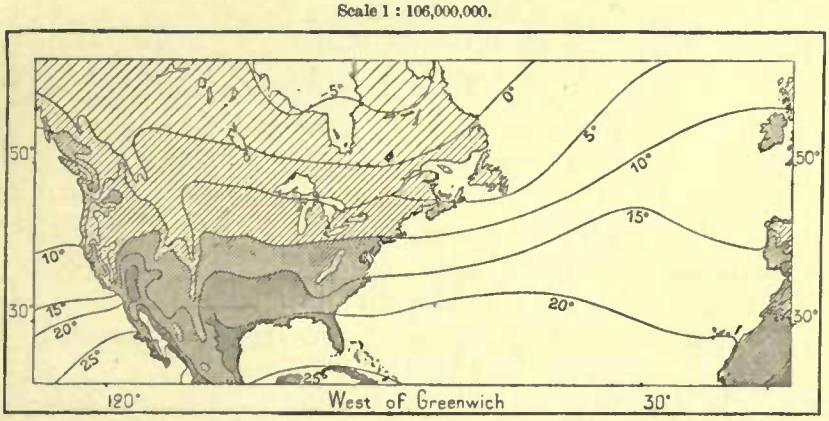
Thus also the passage from Europe to America is facilitated by the climate, despite the differences of latitude. Doubtless the removal from one side of the ocean to the other is always attended by risk to the health of the emigrant, but such risk is less for the emigrant to the United States than it is for emigrants to any other country at as great distance from Europe.

The climate of the United States, while subject to greater extremes of temperature, is also drier, more inconstant, more capricious. Nevertheless, the Englishman may really fancy himself at home in the New England states; the Frenchman might on his part recognise in the Ohio a river of his native land; and for the Spaniard were not the regions of New Mexico and California another Castille and another Andalusia?

According to Gannett the central point round which the temperature of the

Fig. 9.—Isothermals of the United States.

Scale 1 : 106,000,000.



United States oscillates would appear to be 52° F., the same as that of the lower course of the Loire between Tours and Saint-Nazaire. In the United States the population is found to be densest precisely in the zone which corresponds best to West Europe, that is to say, between the isothermals of 50° and 55° F., and the isohyetose lines (lines of equal rainfall) of 30 and 50 inches.

In the interior of the land there are no natural obstacles interrupting its geographical unity in the direction from north to south. The Appalachian and Rocky Mountains, being disposed parallel with the nearest seaboards, could neither prevent nor retard the spread of population along the line of the meridian between the region of the Great Lakes and the Gulf of Mexico. In the Mississippi basin the migrating hordes had, so to say, merely to drift with the current of the great river in order to swarm over the land from its headwaters to the delta.

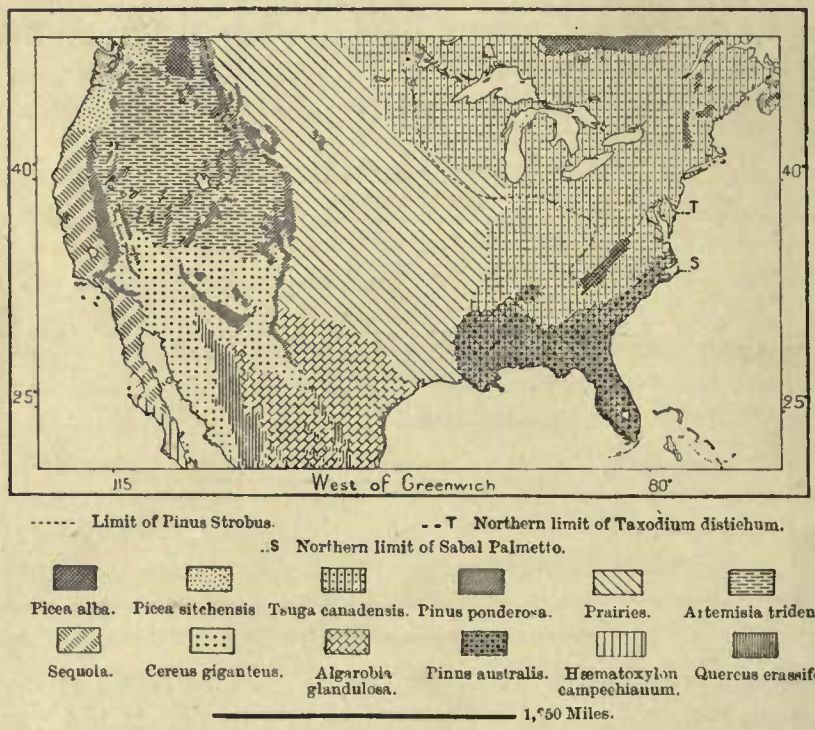
This general form of the relief has imparted to the whole territory a remarkable degree of geographical unity. The transitions from zone to zone, whether of

climate, flora or fauna, take place imperceptibly from latitude to latitude, so that the greatest contrasts in these respects occur in the direction from east to west. Thus the British colonies remained for 150 years confined to the narrow slope of the Atlantic, and the passage over the Appalachians, and across the forests formerly clothing their western slopes, was a most arduous undertaking. The Canadian voyageurs also had great difficulty in surmounting the Rocky Mountains.

In the direction from east to west the climatic zones are indicated by the character of the soil and the local floras. The swampy or low-lying Atlantic coastlands are followed by the Appalachian ranges and plateaux with their large

Fig. 10.—Great Botanical Zones of the United States.

Scale 1 : 50,000,000.



forest growths. Beyond the forests come the prairies, dotted over with clumps of trees, merging gradually in boundless seas of a herbaceous vegetation, steppes, and arid desert regions. The saline plateaux and snowy ranges of the Rocky Mountain region form another zone, which is followed by the Californian lowlands.*

* Main physical regions of the United States :—

	Area in sq. miles (by slopes).	Area in sq. miles (by states).	Pop. in 1890 (with Indians).	Density per sq. mile
Appalachians	276,900	393,200	25,876,232	66
Mississippi, Lakes and Gulf .	1,901,300	1,444,900	33,964,989	24
Rocky Mountains . . .	847,400	1,187,500	3,109,228	3
Alaska	577,000	577,000	31,795	0·05
Total . .	3,602,600		62,982,244	

CHAPTER II.

INHABITANTS—INDIGENOUS AND FOREIGN ELEMENTS.

THERE can be no doubt as to the vast antiquity of man in the present territory of the United States. The finds already made show that he was contemporary with the great pachydermata and the prehistoric horse. The skeleton of a mastodon discovered by Koch on the bed of a swamp in Missouri was surrounded with flint arrowheads and other stone projectiles, which had, doubtless, been hurled against the animal; large heaps of cinders, some no less than six feet high, also show that he was ultimately despatched or perhaps cooked by means of fire.*

In California and Louisiana explorers have also picked up several worked implements, mixed with the remains of huge pachydermata. The gravels where the goldhunters now search for the precious metal date from quaternary times, and it can be stated with certainty that the Californian man lived during that epoch, for in many places these gravels contain stone instruments; even some fragments of human bones have here been collected. The pick has come upon flint objects resting on ground tens of yards below the surface of the primitive soil; such objects have even been found in the erupted basalts. A report was even spread that a human skull had been brought to light on the western slope of the Sierra Nevada, in the Calaveras County, in the tertiary formation itself, under several beds of lava; this skull, however, was not seen *in situ* by any observer, and the miner who produced it stated that he had discovered it in a mine in Bald Mountain, near Altaville, at a depth of forty-four yards; but the hole has ever since been flooded.

But however this be, the extreme antiquity of man is well established, for he was certainly contemporaneous with the large animals that lived before the last glacial epoch. The patient researches made by Abbott in the Trenton glacial deposits between New York and Philadelphia seem to prove that the aborigines dwelt on the banks of the Delaware before the last ice invasion from the north. In this district three successive civilisations, revealed by the corresponding stone implements, have been superimposed like the alluvial deposits of a river. The oldest paleolithic objects, attributed to peoples leading the same kind of life and probably belonging to the same race as the present Eskimo, occur in the beds of sand and

* Dana, *American Journal of Science and Arts*, May, 1875; De Nadaillac, *Prehistoric America*, English edition, 1885; Emil Schmidt, *Spuren des Menschen in Nord-Amerika*.

gravel; they are quite different from the implements of comparatively recent origin, from which they are separated by a bed of glacial drift with striated and polished rocks; one of these objects has even scratches exactly like those of the boulders amongst which it was found.

The antiquity of the fishing people is also as well attested as that of the hunting tribes. The heaps of kitchen refuse occurring in many of the coast districts, on the Pacific as well as on the Atlantic side and along the shores of the tidal estuaries, consist almost exclusively of shells, whence their name of shell-mounds, and they must consequently have been accumulated by fishing peoples. Judging from the vast size of the mounds, these primitive groups must have sojourned for long ages in those maritime districts. Some of the heaps are very thick, and hundreds or even thousands of yards long; one occurs in the outskirts of Baltimore, which supplies the carbonate of lime for smelting the iron ores, and which is still quarried by the contractors for repairing the highways without being yet exhausted.

These kitchen-middens date from a very remote epoch, for none of them have yielded any iron or other metal implements. The objects contained in them are coarse potsherds and flint, horn, and especially bone implements. But on the other hand these remains of prehistoric banquets cannot be referred to quaternary times, for the shells and bones collected by explorers belong to contemporary species, or to such as still lived at the time of the discovery of the New World; such are the Great Auk (*Alca impennis*) and the domestic dog.

If the kitchen refuse bears witness to the presence of man in America at a very remote period, the mounds and barrows which are scattered over almost every part of the present United States territory give evidence of a civilisation already somewhat developed. Although thousands have been levelled by the white settlers, many other thousands still remain. The Ohio valley and the lower Missouri basin are amongst the regions where the mound-builders raised these structures in the greatest profusion. In the state of Ohio alone, as many as ten thousand have been recorded. The Yazoo River owes its Indian name of "Old Ruins" to the countless artificial knolls strewn along its banks. St. Louis also has been called "Mound City" from a hillock that had formerly been raised on the site at present occupied by this town.

Others are seen farther north all the way to the Canadian region traversed by the Red River, which flows to Lake Winnipeg, and farther south away to the banks of the Louisiana bayous. They are also found in the Far West beyond the Rocky Mountains, in the east on the Atlantic seaboard, in Florida, and even on the circumjacent islands. The mounds, nearly all of rectangular shape, vary in height from about two to over thirty yards, and most of them have been raised on the banks of running waters. But besides the simple pyramidal, conical, oblong or octagonal structures, besides the square terraces of the marshy districts, on which stood isolated habitations and even villages, there are yet many other mounds whose form is far more complex, and which often cover a vast extent of ground.

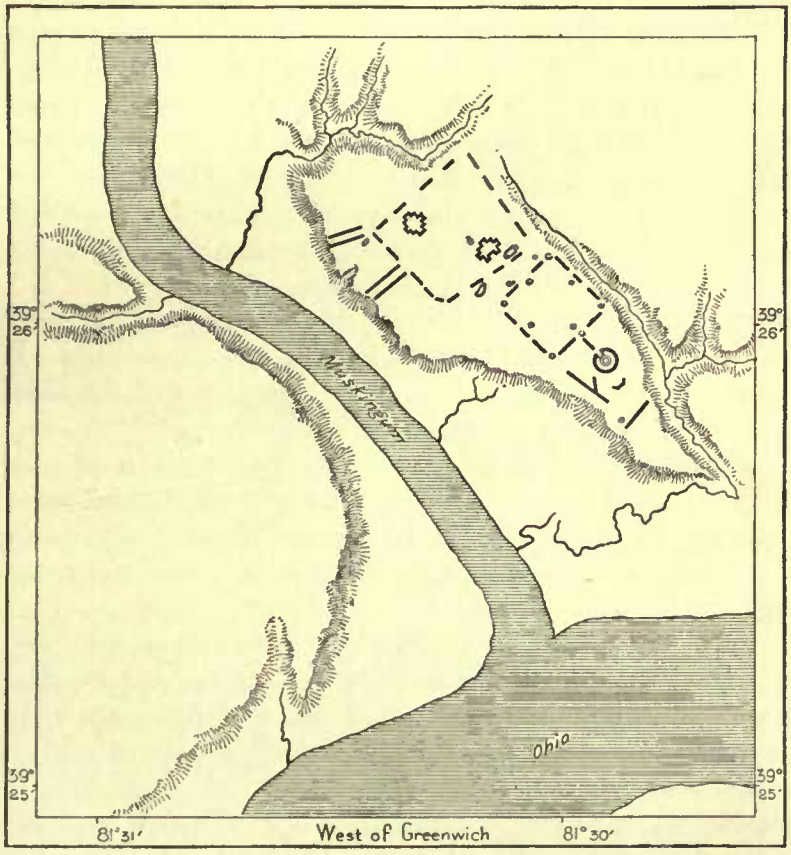
Some of these, such as the works at Marietta, on the Muskingum near its confluence with the Ohio, were evidently fortresses, with defensive works, enclo-

sures, winding paths, trenches, covered and underground passages continued even beneath the river-beds. Such fortified grounds occasionally occupied immense spaces from two to four square miles in extent. Fort Ancient, on the Little Miami River in Ohio, was a fortified village large enough to afford shelter to 35,000 persons.

Archæological research has also shown that of the mounds raised by the Indians of this epoch several were burial-places, like those of the ancient inhabitants of Gaul, Thrace and Scythia. Lastly, tribal and religious symbolism has evidently determined the form of the numerous earthworks, whose outlines repre-

Fig. 11.—Indian Fortifications at Marietta.

Scale 1 : 30,000.



sent otems (totems),* or tutelar animals, such as bears, deer, jaguars, turtles, lizards, herons or frogs.

One of the sepulchral buildings represents a man; others suggest the outlines of a mastodon, while another figures a whole procession of huge beasts following in Indian file. On the banks of Brush Creek, in the State of Ohio, is seen a barrow of unique form in the New World and without analogue in the Old, representing

* Cuoq has shown that the proper form of this word is not *totem*, but *otem*.—*Etudes philologiques sur quelques langues sauvages de l'Amérique.*

a gracefully undulating serpent with its tail in a triple spiral coil; its mouth is open and between its teeth it holds an egg some 300 feet in circumference, the whole distance from head to tail exceeding 1,000 feet. The natives, having no knowledge or traditions of the old builders of this structure, regarded the symbolic snake as the work of a great manitou.

The chief objects of industry contained in the North American mounds are cut or perforated bones, flint instruments, children's whistles, dolls, warriors' ornaments, carved shells, earthenware embellished with colours which rapidly fade when exposed to the air. Like the mounds themselves these vessels affect the form of various animals, some even representing human beings. Pipes are found in all the mounds, some in baked or dried clay, others in hard stone, even in porphyry, and fashioned in a thousand ways, bespeaking the artistic fancy of the old mound-builders. Like the shellfish-eaters, these peoples had no knowledge of iron; but they were acquainted with copper, a metal which came from the rich mines situated on the banks of Lake Superior, in the Keweenaw peninsula, and in Isle Royale These old mines have been discovered, with their supporting galleries half hidden by the vegetable humus where whole forests have sprung up. The hatchets and knives detached from the blocks of metal still lie strewn about in these ancient excavations.

The first explorers of the American mounds, struck by the difference between the civilisation of their builders and that of the present generation of Indians, were inclined to conclude that the two races were entirely different, and that the former disappeared by the process of extermination.

But most modern anthropologists are, on the contrary, disposed to recognise in the American aborigines an unbroken continuity of the ethnical elements; nor do they at all admit that the mound-builders were in any way superior in the industries and general culture to the Indians found in the country by Jacques Cartier and the other European pioneers.

Many of the mounds already examined by archæologists must be very old, for the human bones found in them are almost entirely decomposed. The animal remains, however, even in the very oldest, all belong to species still living in the country or in neighbouring lands, showing that the climate of that epoch was the same as at present.

It may also be asked whether there has not been a gradual transition from the architecture of the Ohio mounds—four-sided step pyramids—to the true pyramids of dried bricks which are met in New Mexico and Arizona, and the perfect type of which is presented by the Aztec and Maya temples of Anahuac and Yucatan? Like the Mexican edifices, the Illinois and Missouri structures rest against adobe walls, and certain carved shells are Aztec in design.

Moreover, even in the upper Mississippi basin modern historic evidence shows that the erection of mounds still went on for some time after the arrival of the Europeans. The Creeks in the extreme south were mound-builders, as were also their Seminole neighbours in Florida, the Cherokees of Georgia, and the Natchez of the Mississippi.

During the period when fishing populations dwelt on the Atlantic shores, or when agricultural tribes occupied certain parts of the interior, such as the fertile Ohio, Missouri, and lower Mississippi valleys, the North American Indians were probably more numerous than they were found to be by the Europeans four centuries ago. According to Bancroft, not more than 300,000 natives occupied the section of the northern continent comprised between the Great Lakes, the St. Lawrence, the Atlantic, the Gulf of Mexico, and the Rocky Mountains. Certainly this is a very small number for such a vast territory. Nevertheless the estimate is justified by sound reasoning and the known historic facts.

At the time of the discovery the most civilised Redskins this side Mississippi, those at least who dwelt north of the Ohio, had but a rudimentary knowledge of husbandry. The Illinois "made Indian wheat [maize] mostly thrice a year, and all [had] water melons to refresh themselves during the heats."—(*Joliet.*) The Iroquois, the Hurons, the Algonquins of the coastlands, and other half-sedentary peoples, had also little clearings round their wigwams. The agricultural nations of the south, such as the Appalachians, the Cherokees, and the Natchez, who occupied the uplands of the southern Appalachian mountains, the Mississippi valley, and especially the part bordering on the Gulf of Mexico, even possessed the *prunus Chickasaw*, a fruit-tree which is no longer found in the wild state, but only in the cultivated clearings since abandoned by the Indians.—(*Brinton.*)

Had these various agricultural peoples been allowed to enjoy their plantations in peace, there would have been no lack of space, and the plains might have teemed with millions and millions of human beings. But these settled tribes, being tied to the land, were for that very reason more easily subdued. A firm rule of chiefs and priests established over them had kept them in close control, in order to "protect" them from the raids of the hunting tribes, and at the time when the whites first made their appearance in the country these sedentary communities were for the most part on the decline. Vast territories were already abandoned, and travellers often made long journeys through the forests without seeing the least trace of human habitations.

As to the pastoral stage, which the historians of the Old World, overlooking the conditions of America, supposed to be a social state necessarily intermediate between the civilisation of the hunting and agricultural populations, such a stage had no existence at all in North America. The Indians had domesticated neither the bison of the prairies nor the goat of the Rocky Mountains.

For most of the nomad tribes of the Redskins, the vast forests, the savannas, the marshy plains were mere battlefields or hunting-grounds, and the hostile populations roaming over domains with ever-shifting frontiers were separated from each other by enormous uninhabited spaces. According to Lubbock, the normal proportion of game to a population depending for its existence on such food must be estimated at 750 animals per man, renewed from year to year by natural increase. Thus the tribes had to maintain a state of war and incessantly decimate each other to spare the game. The life of wild animals was more valuable than that of aliens. At the most flourishing period of their history, the

Iroquois, Cherokee, Creek, Choctaw, or Ojibway nations had never more than four or five thousand warriors each.

According to the testimony of the early settlers the aborigines of New England taken collectively comprised at the utmost 20,000 persons. If we add to the native population of the Atlantic seaboard and Mississippi basin the relatively more numerous tribes, who till recent times were in peaceful possession of certain Rocky Mountain valleys and of the Pacific slope, we arrive at the conclusion that the number of aborigines scattered over the present United States territory scarcely exceeded half a million at the time when the Europeans first arrived on the North American continent. A detailed table prepared by Garland from the reports of travellers and missionaries gives 570,000 as the number approximating nearest to the truth at the beginning of the seventeenth century.

All the members of the various North American tribes present great uniformity in their physical appearance, and in this connection writers have often quoted the remark made by d'Ulloa in the last century that "when you have seen one Indian you have seen all." Nevertheless, this is a highly exaggerated statement, and undoubtedly the natives themselves clearly perceive all the contrasts in appearance and expression by which the various tribal groups are distinguished one from the other. At the same time it cannot be denied that the general type of the Indian presents great uniformity from one end of the Union to the other; in many cases their language alone enables the observer to determine, if not the race, at least the ethnical group to which certain individuals belong.

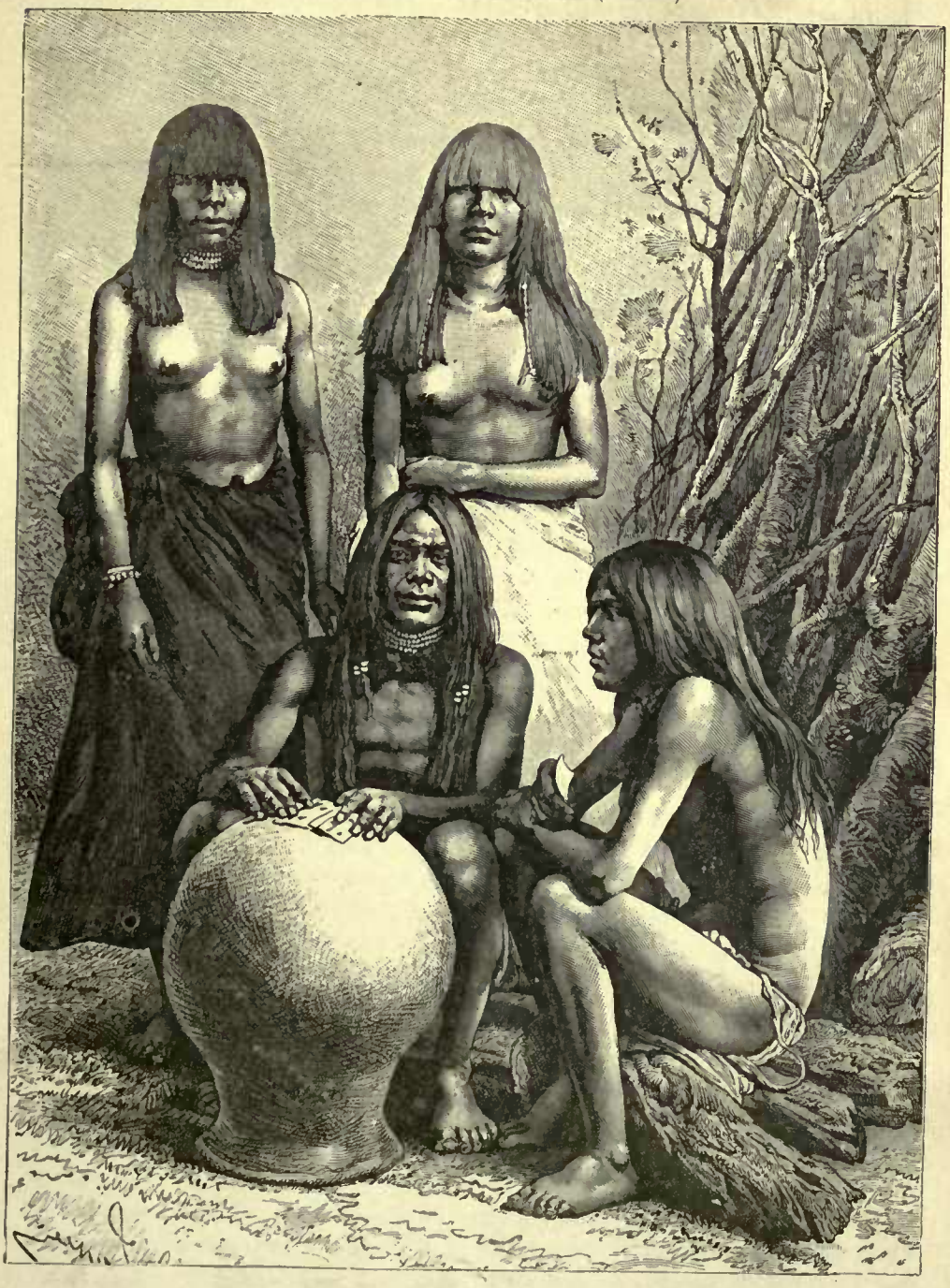
The colour to which the North American aborigines owe their name of "Redskins" is yellowish in infancy, after which it gradually grows red. Consequently, argues Manouvrier, the red races do not differ essentially from the yellow, at least so far as regards complexion, and from this point of view they might be regarded as Asiatic races modified in their new environment. In the children may also be observed narrow oblique eyes, which are given as a characteristic of the Mongols.

Nevertheless, the differences between the Mongolic and North American types are in other respects well marked, and in their structure the respective forms of speech prevent absolute contrasts. According to Volney the Miamis, amongst whom he resided, were as white as he was himself. The reddish hue which they gradually acquired, and which is much more highly-esteemed than a fair complexion, is by him attributed to their lives passed in the open air, where they become tanned by the sun, "father of colour." Amongst other tribes, notably the Californian Diggers, the hue is almost black.

The form of the American skull is by no means uniform. Most of the Redskins have brachycephalic (round) heads, while that of others is highly dolichocephalic (long). In no region is the divergence in this respect greater than in America. The aborigines of the New World also present great contrasts in the capacity of the brain-pan. According to Morton and Aitken the average for all the Indians would be 1,376 cubic centimeters; but some of the Redskin tribes have skulls of surprising dimensions. For the Ojibways and Potawatomees the mean cranial capacity is stated by Morton to exceed 1,492 cubic centimeters. The

average of seven adult male Chinook skulls preserved in the London College of Surgeons is 1,589 cubic centimeters, a volume far superior to the average for the

Fig. 12.—Group of Pimo Indians (Arizona).



inhabitants of France and England. The cranium of a skeleton found in Tennessee when measured gave the prodigious index number of 1,825 cubic centimeters.

These skulls may doubtless possibly be exceptional, and the normal capacity may on the whole be less amongst the indigenous populations of the United States; but the fact remains that the crania of some Indian tribes are of surprising amplitude. But those of the civilised Mexicans and Peruvians are on the contrary comparatively very small, 1,339 and 1,234 cubic centimeters respectively. Such a contrast seemed at first contradictory, and it was asked how the savages of the North American forests could be superior in cerebral power to the relatively civilised inhabitants of the elevated plateaux.

Yet if cranial capacities are really the normal index of greater intellectual vigour, the North American savages, struggling so fiercely for their daily existence, must assuredly have a far more intense mental energy, a far more active initiative than the wretched Peruvian Quichuas, who have been habituated to servitude at all epochs of their history.

Apart from the tribes debased by debauchery and drink, and these are numerous enough on the plateaux of Utah and the Californian plains, most of the Indians are of high stature, with strong muscular development. For 381 Iroquois who joined the Federal Army during the Civil War, and who were no doubt amongst the finest and strongest of their race, the average height was 5 feet 10 inches, which is about the same as that of the natives of Galloway in Scotland.

The few survivors of the Seminoles in the peninsula of Florida are also taller than their white or black neighbours; Sir Walter Raleigh speaks of the savages whom he met in Virginia as "gigantic monsters."

But although very strong and active, the natives, even when equally vigorous, have a less robust appearance than Europeans. The difference is attributed to their less prominent muscular system. Their lank hair, round and sometimes hanging cheeks and flowing costume give a feminine appearance to many warriors, who nevertheless have nothing feminine in their character.

At present the native costume, except on gala days, is little more than a make-up of second-hand clothes. Formerly it varied with the district and manner of life. Hunters were fond of arraying themselves in skins of animals; they wore robes of elk or bison skins, and decked themselves with eagles' feathers, fox-tails, or the quills of porcupines. The agricultural peoples combined woven fabrics with the spoils of animals, or else dressed in materials made of bark or root-fibres. Thus the Seminoles of Florida wear a cotton blouse girdled round at the waist; they also tie a cravat round their neck, and envelop their head in a kind of turban composed of woollen scarfs.

The different cut, designs and ornamentation helped to distinguish the various populations. At the sight of a warrior his nation was at once recognised, and the initiated could tell from some apparently insignificant detail whether he came to trade, announce peace or proclaim war. The colours with which the men painted their face had a well-understood meaning, whence the expression "war-paint;" and the typical colours changed with the various regions, and according to the circumstances of feasts, mournings and the like. Tattooing had also its significance, especially when it represented the animals or other objects symbolising the

rattle of scorn and pride. But such atrocious scenes of torture have long passed away. In the intertribal feuds the Indian's only ambition is to scalp the enemy living or dead, and adorn his tent with the "hair of the vanquished."

The vastness of the spaces to be traversed compelled the natives to live in small groups. Their political world, limited to the circle of their nearest kindred, was necessarily very narrow. But all the closer was the union between the members of the clan and allied tribes. From childhood upwards they had learnt that their life belonged to their kinsfolk, and they fearlessly sacrificed it when required by the collective honour.

In such a narrow political system, where existence and the common weal depended on the devotion of all to the public interests, there could be no supreme autocratic rule, such as was developed amongst the agricultural peoples, tied to the soil. The word "king" is untranslatable in any Indian tongue, for the very idea answering to the term is absolutely unknown to the Redskins. The "chief" is merely "the first among his peers," the companion on whom, in case of danger, they most reckon, either for his personal merits or for the magic virtues attached to his name or family.

But on the other hand the feeling of exclusive patriotism in respect of the clan to which they belong prevents them from understanding the idea of "republic" any more than that of "kingdom." They hold by the nobility of their name and kindred as much as any lord of England or Spanish grandee. The pride of clanship, the possession of a badge or otem, the glory of belonging to a renowned tribe, inspire the Indian with a supreme contempt for all those who are not of his blood. The "Beaver" looks with contempt on the "Deer," the "Deer" speaks with disgust of the "Fox." The symbol chosen by each group is at once a sign of union for the associated, and of hatred towards all others.

Nevertheless, the isolation of families united under the same otem does not contribute to maintain the purity of the race. On the contrary, the associated members, being regarded as brothers and sisters, cannot intermarry. In most of the tribes such a union would be regarded as incestuous. Hence the young warrior has to seek his bride outside the clan, even though it be in some tribe of different speech and origin. On the other hand, when the group is reduced in numerical importance by epidemics, famine or war, it may be reconstituted by the admittance of adopted children, nay, even of prisoners of war. The new arrivals cherish the same love, the same devotion, for the tribe as do its own kith and kin.

The tribes, demoralised and humiliated by defeat, flight and successive displacements, as well as by the degradation caused by gambling, drink and mendicity, have grown somewhat heedless of their future. But at a period when they were still animated by a proud and hopeful spirit, one of the chief cares of the community was the education of the children. This education was at the same time an easy task thanks to their simple lives passed mainly in the open air. Adepts in taming wild animals, with whose ways and wants they are familiar, they show no less skill in training the young, who have one day to take their place as props and defenders of the tribe.

The child, which is weaned after a period of a twelvemonth, is allowed, when strong enough, to run about with the others outside the village. Soon he is provided with his bow and arrow, practises at the target, leaps and jumps about, tries to run down the animals, and learns their habits by imitating them. He glides along like the weasel, runs like the wolf, erects himself like the bear; a hunter by nature, he already joins in little expeditions with his playmates.

But however skilful, vigorous and brave he may become, he well knows that he cannot enter man's estate, take part in the assemblies, or claim the name of warrior, until he has given proof of the power of endurance that is in him. Hence he is the first to demand the ordeal which will entitle him to rank with men, and this ordeal is terrible. The parents are fully aware of its nature, but more even than the other Indians they are anxious that their son, a child of the tribe, should enter with honour on his new life of a warrior. There is no kind of torture, varying according to traditional and local usage, to which the candidates for the test of manhood have not been subjected. Long fastings, exposure of the naked body to stinging insects, to intense cold and the scorching rays of the sun, gashings and deep wounds, straining of the limbs with weights and the forceps, suspension by the hair of the head or by the skin, lastly, insults and outrages—such are the sufferings inflicted on the candidates during those days of probation, during which they will dream the "dream of life," and often allow themselves to be done to death rather than cry out for mercy.

But however great their strength of soul in the face of dangers and sufferings, the Indians none the less remain children in many respects. Thus the young man at times gives way to all the exultation of his joy in mere existence, to all the blandishments natural to his age. Warriors disfigured by small-pox have been known to commit suicide to escape the shame of their marred beauty.

The native genius is remarkably inventive in discovering new and striking ornaments for their costume and headdress. The variety of colours used in painting the face is endless; at times the paintings present startling contrasts on both sides of the countenance: one eye seems extinguished, while the other is all aglow; one cheek beams like the sun, the other, all black, merges in the hair. Often the paintings are changed so as to imitate the successive phases of the moon. Usually the first coat is a vermilion red, the colour of joy and strength, which symbolises the race, and on this ground they apply the other colours, all the various shades of yellow and blue, in spots, stars, crosses, and bars. Moreover, every fresh event involves a change of style, more bright or sombre according to circumstances.

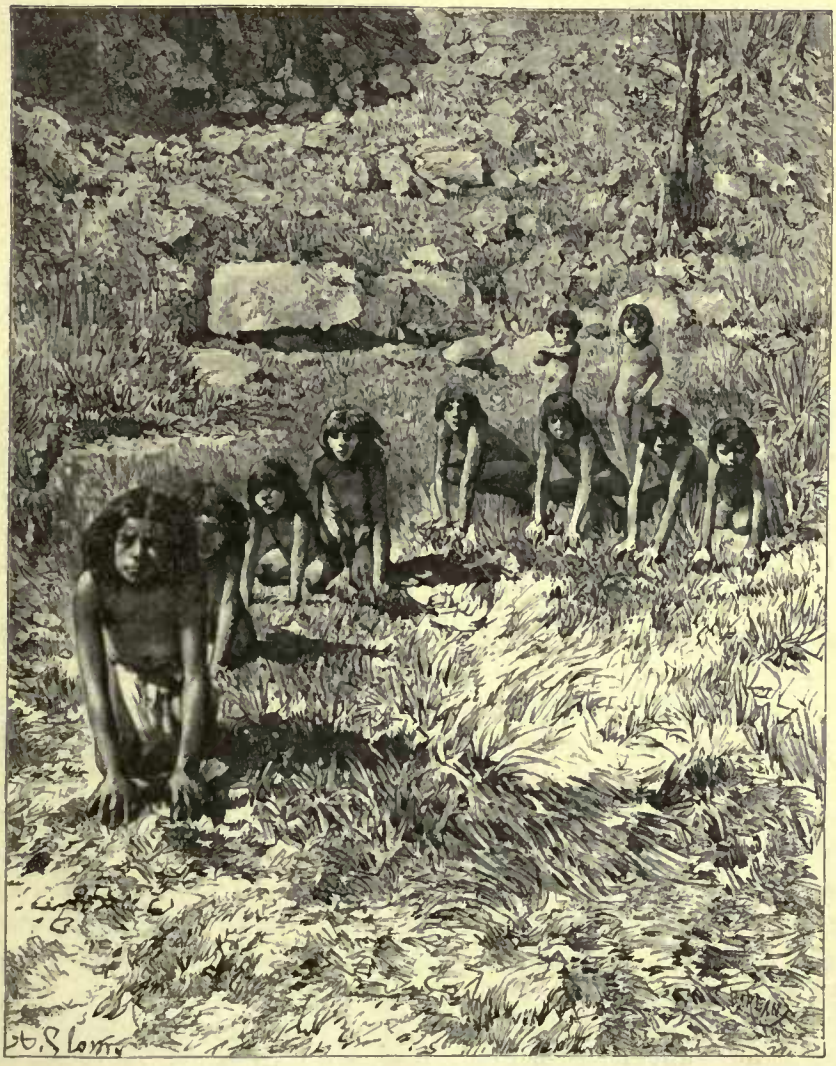
The men undertake the dangerous duties required by the common interests—the chase and war. They have also reserved to themselves the functions of the general assemblies. Hence they are taught to speak and express themselves with a poetic eloquence, some examples of which, recorded by the early historians, reach the standard of perfect beauty. The men may also devote their time to decorating their arms, painting or embroidering their garments.

But on the woman falls all the heavy work, as well as the household duties.

She tills the land, sows the corn, and reaps the crop; she receives the produce of the chase, and turns it all to account, the flesh for food, the sinews and tendons in the preparation of the implements of the chase, the bones for diverse domestic purposes, the skins for the costume, the "leather stockings," the mocassins.

The Indian takes pride in departing this life with dignity, not only when a

Fig. 14.—The Game of Wolf and Bear



violent death awaits him in presence of the enemy, but also when condemned by age or ailments to pass away ingloriously in the midst of his people. Like the wounded animal he seeks some dark recess to sleep in peace. In many tribes, as, for instance, amongst the Dakotas, where, owing to the severe climate and lack of game, the struggle for existence was exceptionally hard, the aged were the first to ask for death. In such cases it was thought filial piety for their own children to dispatch them from this vale of tears to the spirit world, where suffering is

unknown. For people who believed in an after life, such an act was regarded as a supreme proof of affection.

Amongst the Indians, as amongst most peoples in their childhood, the funeral rites were associated with banquets for the dead, who received provisions and arms for their long journey. The Snake Indians even killed the chief's favourite horse, and the wife herself, so that he might not have to travel alone to the spirit land. The Ojibway mother, when one of her infants dies, immediately prepares a doll, which she dresses in the child's clothes, and adorns with its hair intertwined with ribbons. This curious effigy, which she calls her "grief," and which reminds her of her lost one, she places in the cradle, sprinkles with a few drops of her milk, carries about in her arms, entrusts to the other children to take it for a walk. It is thus kept for months, even for a year, until the departed darling is supposed to be big enough to find its way alone to the after-world.

But death is the great mystery. Despite their belief in immortality, the survivors have none the less the instinct of life, and when illness strikes down a young or still vigorous man, they struggle energetically against the malady, and strive to scare the evil spirit returning from the other world in search of companions. The wizards assemble to beat the drum and raise shouts to drive away the ghost. But if their efforts fail, and the spirit receives the last breath of the sick one whom he came to carry off, the body is immediately carried away, not through the door, but through a hole made in the side of the wigwam. Then the hearth fire is quenched, the hut demolished, and the spot beaten smooth in order to efface all traces of the old dwelling. In the new home the fire is kindled with a fresh spark taken from the brasier of a family in good health, and from all quarters people gather to console the living and with their songs and discourse dispel the dread thought of death.

The memory of their forefathers is intimately associated with the religious ideas of the aborigines. It seems natural enough that they should turn to their predecessors to learn from them the mysteries of the unknown world. The idea of extinction not being grasped, the present life was supposed to be continued beyond the grave. But the sentiments of hatred or fear, of admiration or affection were consequently also supposed to be perpetuated amongst the departed, and thus the dead became transformed to good or evil spirits, to protectors or wicked demons. At times they became the otems of the tribe, and so the two worlds, the natural and the preternatural, were incessantly intermingled.

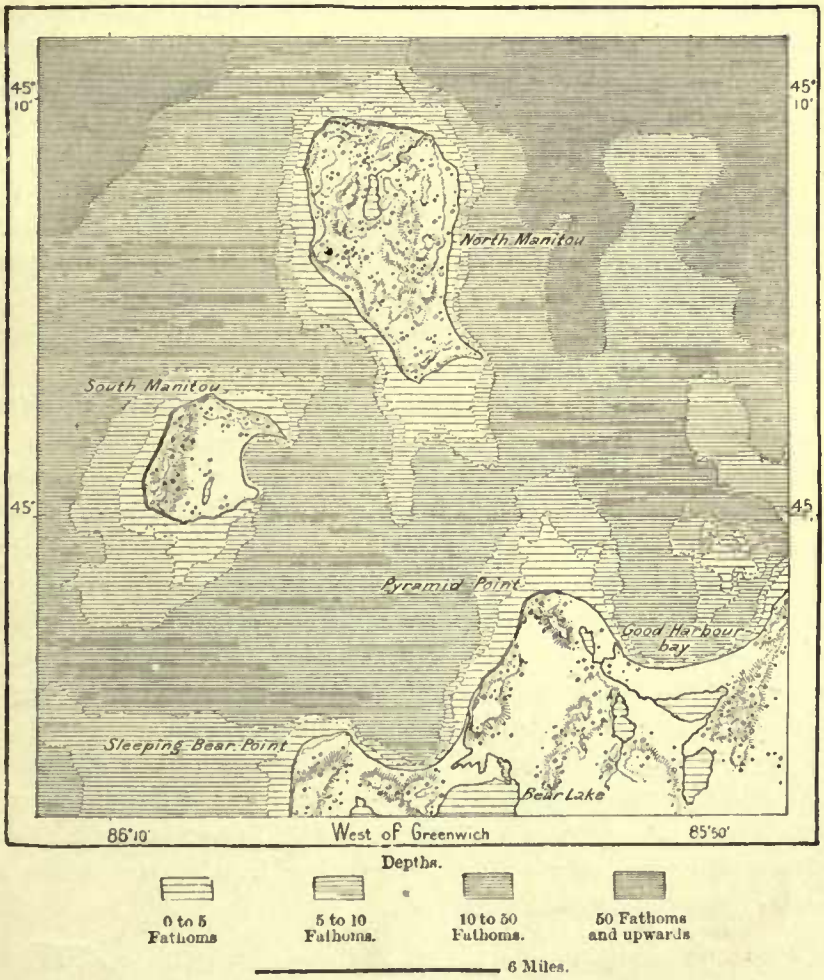
Nevertheless, this unknown bourne, to which the imagination of the Redskins gave "a local habitation and a name," formed but a small part of the general mystery surrounding them. Attempts had also to be made to explain the natural phenomena, and in their primary state of ignorance this could be done only by means of legends. Everything assumed life in their eyes, either to favour or thwart them. Every living being, every strange object, every unintelligible manifestation of nature was for them, as it is for all primitive peoples, a spirit, a "medicine," that is to say, a force always at work for good or evil.

A living man, no less than the dead, might become for the Indian an object

of superstitious worship. He venerated the *meda*, or magician, who pretended to understand the secrets of nature. He venerated the brave also, who feared no death, and this very sentiment explains the acts of religious cannibalism described by the early travellers. Even quite recently the renowned Dakota chief, Sitting Bull, opened the breasts of Federal officers who had fallen heroically in battle, and ate their hearts in order to nourish his valour with that of the enemy.

Moreover, each tribe had a special regard for the animal which served as its otem, and of which it called itself daughter. The mysterious snake also, which

Fig. 15.—Manitou Islands.
Scale 1 : 330,000.



glides through the grass and disappears in the ground, is one of the beings whose name is most frequently heard in song and legend. The nutritive plants are similarly venerated, and the spirits of corn, beans, peas and the pumpkin are solemnly invoked. The fire, which cooks the viands and which warms the sick and the cold, likewise receives its offerings; the hunter throws to the plains a little of the fat, a few fibres from the muscles of the captured prey. Even the

very instruments and weapons that have long been in use are supposed to have a sort of life, and become domestic genii.

But the grand ceremonies are celebrated especially in honour of the natural phenomena, the rainbow, the storm, the clouds, the light of the heavenly orbs. The vanished Natchez nation was one of those that associated the events of their daily life with the orderly path of the sun. The whole routine of their existence was a continued worship of the fire. Every morning the high priest hailed the rising sun in the name of his people, offering it his calumet, and with his finger indicating the track which he expected to see it follow across the firmament.

The chief feasts of the Pueblos and other New Mexican and Arizona Indians are also made in honour of the sun, which from the Flat-Heads even received sanguinary offerings. The bravest woman of the tribe presented him with a piece of her flesh cut from her breast, and this had also to be done by the son of the chief. The dances, religious acts in a pre-eminent sense, have for the most part an astronomic character, and solar worship also appears in the paintings with which the Indian artists embellish their festive robes, their tent skins, the bark of trees, and the surface of the rocks. The sacred calumet, painted blue, which was decked with many-coloured feathers, and which was held up between combatants to stop hostilities, appeared in the eyes of all an image of the blue sky and sun. Presented to the four quarters of the heavens, it traced on the ground the figure of a large cross, rendering it propitious to human enterprises.

All these genii, all these forces of the earth and of the firmament, culminated in one supreme and mysterious spirit. The term Manitou (Manito), usually supposed to mean "Great Spirit," would have been much more correctly interpreted in the sense of the "Unknown." The first Catholic and Protestant missionaries, who visited the Algonquian tribes on the shores of the Great Lakes, or in the forests of New England, studied these newly-discovered peoples from the standpoint of their own preconceived ideas. Some sought in the religion of the aborigines traces of Judaism, or even of some ancient Christian revelation, others recognised in it nothing but the work of the devil, and prematurely stigmatised the words and acts of the natives as blasphemy and profanation.

Yet the Indians in no respect yielded to the Puritans in their serious view of life and respect for the supernatural. Veneration is one of the distinctive traits of the Redskins, none of whose languages possess irreverent terms offensive to their Manitous; when they want to swear, they have to borrow the abusive expressions from English or French.

Tribes and Nations—The Algonquian Family.*

As in the St. Lawrence basin, the tribal family most numerously represented in the territory east of the Mississippi was that to which the French have given the name of Algonquins. The Lenni-Lenâpé, that is, "Original Men," who

* The ending *-an* is here adopted with J. W. Powell (*Linguistic Stocks of American Indians North of Mexico*, 1891) in the widest collective sense, to indicate the whole family or group, that is, all the tribes speaking dialects of a common stock language. Thus *Iroquois* comprises only the "Six Nations," but *Iroquoian* comprises the Hurons and the Cherokees as well, and all the other tribes speaking idioms derived from the common Iroquoian stock language.

were the nation in a pre-eminent sense of this Algonquian family, dwelt on the banks of the Delaware and Schuylkill in the present states of Pennsylvania and New Jersey. A very large number of clans, all calling themselves "children" or "nephews" of the Lenni-Lenâpé, were scattered round the chief tribe; they were met in the whole region stretching from the Labrador plateaux southwards to the northern estuaries of Georgia, and from the shores of Chesapeake Bay westwards to the Athabaska, a space altogether of about 1,500,000 square miles. This vast territory, however, was shared by them with the Iroquois and some other peoples of different ethnical families.

In the north-east the region of the fjords was occupied by the Mic-Macs and Etchemins jointly with the Abenaki, or "People of the Dawn." The Massachusetts, the Narragansetts, Pequods, Mohicans, Manhattans, and other clans, whose names still survive as the designation of states, districts, towns or islands, in New England and New York, were dominant in this part of the coastlands and on the banks of the Hudson.

South of the Lenni-Lenâpé dwelt the Powhattans, the Accomacs and Pamlicos, while in the Alleghanies the hunting-grounds from South Carolina to Kentucky were roamed especially by the Shawnees, or "Men of the South." South of the Great Lakes the Ottawas, Miamis and Potawatomees, the Illinois with their Kaskaskia, Cahokia and Peoria sub-tribes, the Saulteux or Ojibways of Lake Superior, the Menomonees of Green Bay (Lake Michigan), the Mascoutins, or "Prairie Men," of the Mississippi valley, the Kickapoos, Sacs (Sauks), and Foxes of Wisconsin and the trans-Mississippi region, the Cheyennes, and the Blackfeet, were all alike Algonquians.

The Lenâpé language, a typical member of the Algonquian family, is one of those which are usually referred to as an example of the American polysynthetic idioms, in which the words of the sentence tend to merge in a single polysyllable of great length, each syllable often representing a distinct word more or less modified or reduced by contraction, and acquiring its definite meaning from its position relative to the other syllables. Most of the Indian expressions that have passed over to the European languages proceed from one or other of the numerous Algonquian dialects; such are the terms, "Manitou" (Manito, Manitto), spirit, great spirit, the unknown forces of nature; "sagamore" and "sachem" (sakima), applied to chiefs or headmen.

The Iroquoian or Wyandottian Family.

The great Iroquoian or Wyandottian family, represented in Canada by the Hurons and Iroquois, had also a wide domain south of the Great Lakes. Some of the Hurons, driven by people of the same stock from the inter-lacustrine region that has now become the Canadian province of Ontario, had escaped beyond Lake Superior, and formed camping-grounds in the woods and prairies which were also frequented by the Ojibways. Others had penetrated southwards in the direction of the waterparting between the basins of the Great Lakes and Ohio River. Thus from the shores of Lake Erie to those of the Mississippi were

scattered numerous groups of Hurons; known, however, by the most varied designations. Some of the same race were even found, possibly from a remote period, on the Virginian coastlands and in North Carolina and Tennessee. Such were the Chowans, the Nottoways, the Cherokees, and perhaps the far-famed Tuscaroras, who later retraced their steps northwards and joined the Iroquois league.

These Iroquois, who played a conspicuous part in the modern history of North America, were the undisputed masters of the territory comprised between the Green Mountains, Lake Erie and the region about the headwaters of the Ohio, Delaware and Susquehanna rivers. Moreover, the terror inspired by their name caused them to be dreaded far beyond the limits of their national hunting-grounds. Numerous tribes of their own and of other races obeyed their orders; they overruled the tribes of New England, and when William Penn penetrated

Fig. 16. – Frontier of the Iroquois Nation after the Cession of Canada to England.
Scale 1 : 14,000,000.

Indian Frontier in 1768.

310 Miles.

into the domain of the Algonquian Delawares (Lenni-Lenâpé), he found that these had already given up all right to resist the exactions of the Iroquois.

The Iroquois were dreaded also by the whites, and with good reason. Occupying the intermediate space between the regions colonised by the French and English, these Indians held the balance between the domains of the two rival nations, and possibly the English may have, in some measure at least, been indebted for their final triumph to the advantage of having the Iroquois on their side. This powerful federation, treated on a footing of equality with Great Britain, exacted a scrupulous respect for their frontiers, which in this direction coincided with the watershed of the Susquehanna and the course of the Ohio from near its source to the Mississippi confluence.

The military strength of the Iroquois was derived especially from their constitution, a league of "nations," enjoying self-government in all special

INDIAN ENCAMPMENT IN A RESERVE.

administrative matters, but closely united in the struggle against the common enemy. The Americans have been inclined to recognise in this league the model which in their own constitution gives equal rights to each citizen and to each state as collective individualities. The original "five nations," whose descendants still exist, dwelling in the same country as their forefathers, were the Mohawks, Oneidas, Onondagas, Cayugas and Senecas, who in 1714 were joined by a sixth nation, that of the Tuscaroras from the south. Hence the conquering league of the Iroquois is known in history as that both of the "Five" and "Six" Nations. Among the natives themselves the general designation of the league was *Hodenosaunee*, or "People of the Long Cabin," in allusion to their common life in a great confederacy.

The Cherokees, or "Beloved People," constituted another ethnical group of the Iroquoian family. They were a highland people, living in hundreds of separate communities in the upper Appalachian valleys, both on the eastern and western slopes of the range, as well as on the plains of the Tennessee River as far as the Muscle Shoal rapids, Alabama.

Occupying one of the most delightful regions in North America, where every district has its diversified woodlands, its hills and rocks, its fertile valleys and running waters, the Cherokees were one of the most sedentary of all the aboriginal populations. They had their permanent cabins and encampments, and when they were compelled to forsake their ancestral homes, and remove to reserves beyond the Mississippi, they cheerfully resigned themselves to the inevitable, and in their new territory maintained the advantage that a long inheritance of civilisation had given them over the other Indian peoples. Even now they are still regarded as the foremost of the cultured nations amongst the descendants of the aborigines.

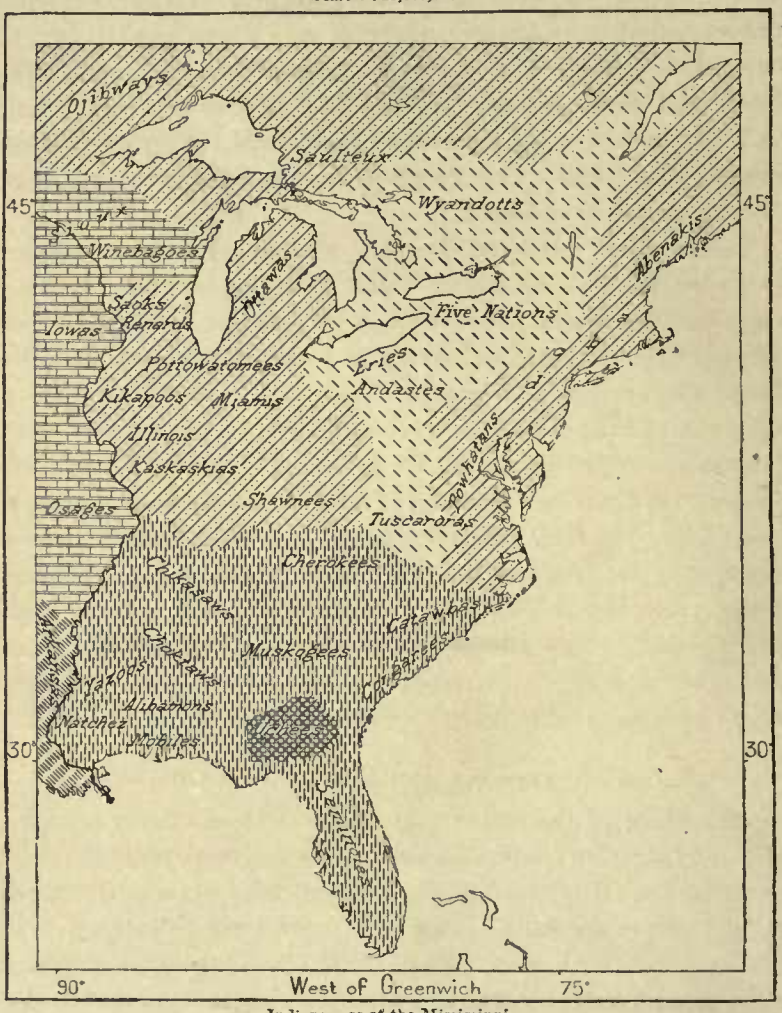
The Muskhogean and Natchesan Families.

Nearly the whole of the region east of the Mississippi not occupied by the Algonquian and Iroquoian families belonged to various branches of the Muskhogean (Muskogean) family. The Mobiles, who have left their name to the bay adjoining the Mississippi delta; the Alibamons, whose name survives in that of the great river Alabama; the Chickasaws, who dwelt chiefly in the pleasantly-undulating plains of the upper Tombigbee, but who also held camping-grounds on the heights facing the Mississippi; the Creeks, or Muskogees, people who inhabited the low-lying plains of the Atlantic seaboard from the Algonquin frontier at Cape Fear as far as the neck of the peninsula of Florida; the Yamassees, or Savannahs, whose original domain is recalled by the name of a river and a large city; and lastly, between the Alabama and the Mississippi, the Choctaws (Chacta), who became famous for their relations with the French settlers in Louisiana —were all members of the great Muskhogean linguistic family.

Agriculturists, like the Cherokees, and occupied scarcely at all with hunting, the Muskhogees had even approached nearer to a state of civilisation analogous to that of modern societies. In many parts of their domain they had formed large village communities, and in field operations the women were assisted by the men.

The Natchez (Nakché), who were conterminous with the Choctaws and, like them, occupied the eastern banks of the Mississippi, formed a separate nation, distinct in speech, although closely resembling the Alibamons in their mode

Fig. 17.—Aborigines East of the Mississippi in the 16th Century.
Scale 1 : 23,000,000.



of life. Excellent husbandmen, they were also acquainted with a large number of alimentary plants, from which they understood the art of preparing savoury dishes highly appreciated by all their neighbours. The Natchez were perhaps the most civilised nation of the slope facing the Gulf of Mexico. But their very culture, by giving them leisure and even wealth, had facilitated the development

Linguistic Stocks of AMERICAN INDIANS NORTH OF MEXICO

BY

J. W. POWELL.

100 50 0 100 300 600 Statute Miles.

of aristocratic classes, which lived at the expense of the common people contemptuously designated "Stinkards," the "Puants" of French writers.

The Natchez chiefs were "Sun Kings" like Louis XIV., and when they died numerous attendants had to follow them to the grave. The wife of the departed Sun was also strangled, on which account the aristocracy had framed a law interdicting marriage between women of their class and the chiefs.

Some other tribes east of the Mississippi, less famous than the Natchez, appear, like them, to have been linguistically distinct from the dominant Algonquian, Wyandottian, and Muskhogean groups. Such were Timuouanan, or the Seminoles, or "Wild People," who had given up agriculture for the chase and taken refuge in the lacustrine archipelagoes in the interior of Florida; and the Catawbas and Uchees, of the Atlantic slope, both isolated amid populations of different speech. The Uchees, who are quite extinct, are supposed by some ethnologists to have been an outlying branch of the Athabascan family, corresponding on the Atlantic side to the Apaches of the Far West. In Powell's scheme both Uchean and Natchesan are classed as stock languages without any sub-groups.

The Dakotan or Siouan Family.

Till recently the most powerful Indians west of the Mississippi were the Dakotas, who have given their name to two of the states of the North American republic. They are the Naudouisses or Naudouissioux, the "Coupeurs de Gorge" ("Cutthroats") of the early French voyageurs. But the inconveniently long word, *Naudouissioux* has survived only in its last part, *Sioux*, which has become practically synonymous with *Dakota*, as an alternative collective designation of nearly all the Redskins in the northern section of the United States between the Mississippi, the Missouri and the Rocky Mountains.

The missionary, Charles Raymbault, was the first to speak of the Sioux in 1642, but none of the Canadian traders and trappers ("coureurs de bois") resided amongst them before the year 1659. Since that time their tribes had been frequently displaced, even before the later rush of settlers had crowded them out in the direction of the Rockies and the northern frontier. The bulk of the nation has received the name of the "Seven Councils," or rather "Seven Great Council-fires," but the tribes originally associated under this common designation were afterwards joined in various ways by other peoples of the same race. Amongst them were the Winnebagoes, or "Lake People," who lived near the lake of that name, which represents a former southern extension of Green Bay on the west side of Lake Michigan. The Winnebagoes, who had long held aloof, were later removed to Nebraska beyond the Missouri.

Another important branch of the Dakotas, who since the arrival of the Europeans in North America appear to have always inhabited the plains beyond the Mississippi, is the Omaha or Thegiha nation, whose social constitution, thoroughly studied by Dorsey,* is regarded as the type of the Indian tribe.

The Hidatsas, Minetarees, or Gros-Ventres ("Paunches"), of the upper Missouri,

* J. Owen Dorsey, *Omaha Sociology*.

the Upsarokas, or "Crows," of the foothills of the Rocky Mountains, who maintained an almost constant warfare with the kindred Assiniboines of the Canadian frontier, the Osages of the lower Missouri, the Iowas, Otoes and Missouris, the Kansas and Arkansas, whose names are applied both to the states and to the rivers traversing their domain, are also members of the Dakotan family.

Another branch of the same stock are the Mandans, the "Mentons" of the early French voyageurs, who call themselves Namakaki, that is, "Men." Although reduced to a few families by an outbreak of smallpox in 1837, the Mandans were formerly a powerful nation, and one of the most civilised groups of aborigines, with large villages surrounding the "medicine lodge," and carefully cultivated fields stretching to great distances along the watercourses.

Other tribes, such as the Pawnees (Pâni, or "Wolves"), the Arrapahoes, and Ricarees of the western prairies, formerly much dreaded owing to their predatory habits, have by different writers been variously grouped with the Dakotas, Shoshones and Athapascans. Regarded as low-caste marauders by all the noble tribes of the West, the Pawnees were the only people the Canadian traders thought it possible to reduce to a state of slavery. No other nation would have endured it.

Athapascan and Columbian Groups.

The Athapascan tribes, as indicated by their name, occupy the northern wilds of the Athabascan basin; but they have also some representatives south of the Canadian frontier. Nearly all, having been first visited by the Canadian traders, have preserved their French names; such are the Têtes-Plates, now better known as Flat-Heads, the Pend'Oreilles, the Nez-Percés, and the Cœurs d'Alêne. This group of Athapascan tribes is usually known by the collective names of Salish; it comprises most of the natives dwelling south of British Columbia, between the Cascade range and the main chain of the Rockies in the part of the Columbia basin lying to the north of the Dalles. The term Flat-Heads, attributed to the chief tribe, is also applied, even in a higher degree, to all the other members of the family, and notably to the Chinooks. Few other American aborigines are so addicted to the practice of manipulating the skull and introducing ornaments into the nostrils, ears, and lips.

Down to the middle of the present century numerous tribes of diverse speech were crowded together in the narrow zone of the coastlands along the slope of the Cascade Mountains north and south of the Columbia River. This region of deep gorges, similar to many others in the Old World, might be compared to a sort of trap, where easy access was afforded to the Columbia valley, but whence it was difficult to get back. Nowhere else in America is there found such a chaos of distinct tribes unrelated to each other.

Amongst these groups of distinct speech some are Tinneh or Athapascans, some are allied to the Columbians of Vancouver Island, and to others who are supposed to belong to the same stock as the Shoshones. The Nisqually, who dwell on the shores of Puget Sound, are akin to the Vancouver Nootkas, and, like them, live on a fish diet. To the same ethnical division belong the Clallams of Cape Flattery and the Kliketats of the Olympia district.

The Klamaths, who are also a riverine people, and who formerly occupied the fluvial valley of their name, south of the Columbia, form a perfectly distinct ethnical group, which long continued in a state of hostilities against the whites. Hence the name of "Rogues" applied to them by the first Anglo-American settlers in California. Like the Hoopas, the Shastas and the Modocs, they are of Athapascan stock.

The Chinooks, who practise cranial deformation like their Flat-Head neighbours, inhabit the hilly districts of the lower Columbia. They appear to be a very mixed people, probably the result of their constant journeys as carriers and packmen. Besides their native language, they used a trade jargon of a few hundred words, amongst which are several of French and English origin. This lingua-franca has since been greatly developed, and is now the chief medium of intercourse between the whites and the aborigines throughout the whole region of the coastlands from Alaska to the old Spanish missions of South California.

The Shoshonean and Caddoan Families.

To the Shoshonean family belong most of the tribes in the Great Basin and neighbouring mountains. When the Europeans first arrived, the eastern groups occupied the Missouri basin in the present Dakota domain; but with the general displacement of the aboriginal populations they were gradually pressed westward to and beyond the main range of the Rocky Mountains. The Shoshones, or "Snakes," properly so called, at present occupy the elevated plains, limited on the north by the Snake River, to which they have given their name.

Like their western neighbours, the Wihinashts, who dwell amongst the Sierra Nevada uplands, the Shoshones eke out a sorry existence on their arid lands, where they are often reduced to great distress, and even absolute starvation. To the Shoshonean ethnical division belong most of those degraded and almost black natives of the Californian plains who are subject to rickets, and who are collectively known as "Diggers," from their habit of grubbing in the ground either in search of roots, or to make themselves dens. But all the Indian races are represented amongst these wretched famine-stricken fugitives. Like the Shoshones, the Diggers make baskets so closely wickered as to hold water. In these baskets they even boil the water by means of red-hot stones.

Members of the Snake family are also the Utahs (Yutes, Utes), from whom one of the territories of the republic takes its name. These aborigines of the Wahsatch Mountains have no claim to the grave demeanour said to be the chief characteristic of their race; on the contrary, they have for the most part an excessively mobile physiognomy, and speak with great volubility. Their language, like all the other Shoshonean idioms, shows certain phonetic affinities to the Aztec-Sonora group of Mexico, and is one of the most harmonious of Indian tongues; but it is already greatly corrupted, and includes many English and Spanish terms. Even with the Navajo tribes on their southern frontier they are unable to converse except through the medium of a more or less correct Spanish.

The Utahs are amongst the most talented artists of all the aboriginal tribes

In almost every lodge are seen representations of men, animals, tents and diverse objects intended to commemorate battles or other important events.

The Pah-Utahs (Piutes, Pah-Utes), who dwell farther south on the plateaux and in the river gorges tributary to the Colorado, belong to the same group as the Utahs. But in the more arid districts they are reduced to the same miserable condition as the Diggers, with whom the more prosperous Indians associate them in a common feeling of contempt.

Some of the Comanches, or Nayuni, that is, "Neighbours," are conterminous with the Utahs on the east side towards the sources of the Colorado. But the bulk of their nation live farther south along the middle course of the Rio Grande del Norte and in the Pecos valley. The Comanches are akin to the Shoshones, and, like them, speak a language perhaps remotely related to the Aztec-Sonora group. But they are a very mixed people, for the Comanches, like the Apaches, were in the habit of organising warlike and plundering expeditions for the purpose of sweeping from the surrounding plains women and children, that is to say, wives and future companions in arms. Hence amongst them are met many persons who cannot be distinguished from the Crows, Pawnees, Navajos or Ricarees.

Eastwards the Comanches bordered on numerous Texan peoples, who were visited by Cabeça de Vaca, Cavelier de la Salle and other explorers, but who have now disappeared. The Caddoes, who dwelt along the middle course of the Red River, had trading relations on one side with the Comanches, on the other with the Natchitoches, the Nacogdoches, the Attakapas or "Man-Eaters," the Chitimachas of the Têche bayou, the Taensas of the Mississippi, and the Natchez east of that river. The Caddo language served as the medium of intercourse for all these peoples, as the Chinook jargon does for those of the Pacific seaboard.

The Moqui; Yuman and Piman Families.

The Moquis of the lower Colorado, who already show Mexican influences, and wear the Mexican poncho, resemble the aboriginal populations of Anahuac in their traditions and mode of life. Their western and south-western neighbours, the Mojaves (Mohaves) of the lower Colorado, form another distinct ethnical division, which also comprises the Yumas and Cocopas of the Colorado estuary, the Diegueños of the San Diego district, California, the Yaquis of Sonora, the Maricopas of the Gila River, and the Hualapais of north-western Arizona.

These various kindred peoples are for the most part of middle size but well-proportioned and muscular; they live in little houses of beehive form, wooden frames covered with earth and with only one opening. They cultivate the alluvial tracts left dry by the subsidence of the Colorado flood-waters, raising crops of wheat, maize, haricot beans, melons and pumpkins.

Till recently the Mojaves covered the surrounding rocks with inscriptions, and M. Pinart thinks he may state positively that they perfectly understood the meaning of these hieroglyphics; they even still employ them, but are careful not to interpret them to the whites.

Other frontier peoples, notably the Pimos, or Pima, greatly resemble the

KAI-VAV-IT OR KAIBAB WOMEN, PAH-UTE NATION.

Mojaves in appearance, although their language is fundamentally different. They belong to the division represented in Mexico by the Opata nation. Of short stature and for the most part well-shaped, they have a prominent brow, narrow nose, mild expression, soft flesh and fair complexion. From time immemorial possessing a considerable degree of civilisation, the Pimas cultivate the land with intelligence, and construct their irrigation canals with great care. The hydraulic works carried out by their ancestors might serve as models for the

Fig 18. Yuma Indian.

Americans themselves. Drains and trenches, now almost obliterated, may still be traced, winding for a distance of twelve miles round the foot of the hills.

But the Pimas are on the decline, and are well aware of the fact. According to a national tradition, they were driven from their old homes by a ferocious tribe, probably the Apaches, and after seeking refuge in the mountains, returned greatly reduced in numbers, only to find their lands wasted and their buildings destroyed. The ruins of structures still seen on the hillside, the so-called *casas grandes* ("great houses") described by archæologists, would appear to have been the habitations of their forefathers. It is in their territory, on a hill commanding the Gila valley to the north-west of Tucson, that is found the Casa Grande of Montezuma, mentioned

by the Jesuit missionary, Kino, at the end of the seventeenth century. Of this edifice nothing now remains except some walls built of sun-dried bricks.

The Pueblos Indians and Cliff-Dwellers.

Of all the aboriginal natives none have in recent times been more carefully studied than the Pueblos of New Mexico, so named from the nineteen *pueblos* ("villages") inhabited by them. The interest of archæologists and ethnologists has been awakened by the form and magnitude of their dwellings, the antiquities discovered in the country, the Montezuma legend, the memory of the expeditions formerly made in quest of the "Seven Cities of Cibola," the social condition and religious practices of these native communities.

A rich literature has already been devoted to the now impoverished Pueblos, who are supposed by many to form an ethnical transition between the northern mound-builders and the Aztecs of Mexico. They dwell for the most part at a short distance from the banks of the Rio Grande; the Zuñi, however, one of their best-known tribes, are settled far from that river near the sources of the Gila, while the Moqui, who are also reckoned amongst the Pueblos, live near the Colorado in north-east Arizona.

In the Pueblos country were discovered in the middle of the present century * those astonishing habitations of the so-called "Cliff-Dwellers," who perched on the top of steep cliffs, or else occupied natural or artificial caves excavated half-way up the side of these cliffs. The apparently inaccessible heights were scaled by means of long poles with lateral teeth disposed like the rungs of a ladder, and inserted at intervals in notches let into the face of the perpendicular rock.

The most curious of these dwellings, compared to which the most rugged Alpine crags are of easy access, have ceased to be occupied; but the Moqui still possess villages built on sandstone *mesas* or "tables," standing isolated in the midst of a sandy ocean almost destitute of vegetation.

The Moqui have never had anything to fear from the surrounding Apache or Navajo marauders: their eyries could be reached only by a single dangerous track easily defended. They stood in all the greater need of such habitations that they were forbidden by immemorial religious tradition to offer any physical resistance, or to shed human blood under any pretext.

It is evident from the term Pueblos, applied by the Spaniards to the Indian settlements on the Rio Grande, that at the time of the discovery these natives no longer occupied those elevated rocky strongholds, but already dwelt in villages on the plains resembling those still inhabited by the kindred peoples of the Californian peninsula and north Mexican provinces. But their casas grandes are also strongholds, for the outer vertical or step walls present no opening and have to be mounted by means of ladders. When the top is thus reached, the inmates descend on the inner side down to the roofs, platforms and courtyards, grouped round and facing which are the cells of the clan, the whole of which is thus accommodated under a single roof.

* J H Simpson, *Report of the Secretary of War*, 1850; Holmes, Jackson, Powell, Newberry, Schwatka, Hamy, &c.

It is conjectured that the New Mexican Cliff-Dwellers were compelled by the gradual diminution of moisture to descend from the rocky summits, and excavate the artificial caves lower down. This hypothesis is rendered somewhat probable by the so-called *kâ-kâ*, a sacred dance performed especially by the Zuñi, but only on rare occasions, after prolonged droughts. The men alone are privileged to take

Fig. 19.—Indian Populations West of the Mississippi.
Scale 1 : 50,000,000.

Indians beyond the Mississippi.

Algonquians. | Siouans. | Texan Tribes. | Mexicans.

Athapascans. (*a*) Hoopahs. (*b*) Umpquas. | Klamaths (Columbians). | Tinnehs. (*c*) Chillams. (*d*) Songhi.

Indians east of the Mississippi.

Algonquians. | Appalachians.

1,250 Miles.

part in this religious act; the women, however, being also represented by masked youths arrayed in a long black wig.

The division of labour, which English political economists speak of as a discovery of modern industry, prevailed from time out of mind amongst the Pueblos Indians. Each tribe, although completely independent, is united with all the others in a perfect bond of common interests. Thus the Jemez people furnished the cereals, the Cochiti made the earthenware, others wove the textile fabrics, and the Moqui, the poets of these nations, composed the war and love songs.

The Southern Athapascan Families.

In close proximity to these peaceful communities, the most civilised in America north of the Anahuac plateau, roamed the Apaches (Lipanes, Jicarillas, Mescaleros and others), most ferocious of all the marauding tribes. These fierce Apache rovers are an outlying branch of the Athapascan family, far removed from their northern kindred, and driven by the altered conditions, especially the arid character of their new domain, to support themselves at the expense of the inhabitants of the fertile neighbouring valleys. Their last retreat, before the American Government had them interned, was the Metzatzal Sierra in the heart of Arizona. Here in the upper Rio Tinto valley, carved into steep mountain gorges and encircled by rocky cavernous recesses, the indomitable warriors glided from cave to cave beyond the reach of the Federal troops, whom they were able to shoot down from their vantage ground.

The Navajos, also of Athapascan stock, but, according to the national legend, sprung from a maize cob, occupy the plateaux between the Rio Grande and the Colorado. But these have better than their Apache kindred adapted themselves to the changed environment, living not on rapine but by labour and industry. Already half civilised, they have been more successful even than their Spanish neighbours in sheep-breeding. With the wool they have also learnt to weave blankets, which for durability and imperviousness to moisture surpass all similar products of the European looms.

Foreign Settlers—Whites and Blacks.

In European lands it would no longer be possible even approximately to determine the precise ethnical elements of the various races that have gradually merged in homogeneous peoples. Not only are we ignorant of the proportions in which these elements have been intermingled, but ethnologists are still discussing the very identity of the populations bearing a common name in history.

But in the United States it is an easier task for families and communities to trace back their lineage to white ancestors of European origin. Apart from a few unimportant gaps, here we possess the records of colonisation for three hundred years. But although all the ethnical elements merged in the American people are known, it would be rash to assign to each its respective share in forming the mass of the nation, or attempt to determine the special features they have impressed on its character.

In any case it would be a mistake to recognise none but English colonies in the United States, colonies such as they were constituted before the great flood of modern immigration. The term "Anglo-Saxon," often applied to the Union, if taken in the strict ethnical sense, is all the less justified that Great Britain herself is far from being exclusively peopled by the descendants of the Angles and Saxons. The early Britons and Welsh, the Gaels of Ireland and the Scotch Highlanders were admittedly Celts with possibly a substratum of Silurian, Iberian, or other primitive non-Aryan peoples, and this already mixed Celtic race is perhaps more numerously represented in the United States than the Teutonic

element itself. Of over 60,000,000 citizens of the Union, Fleming calculates that not more than 18,000,000 are English, or of English descent.*

But however this be, the North Americans, of such diverse European origin, are a new people, modified at once by crossings and by a climate different from

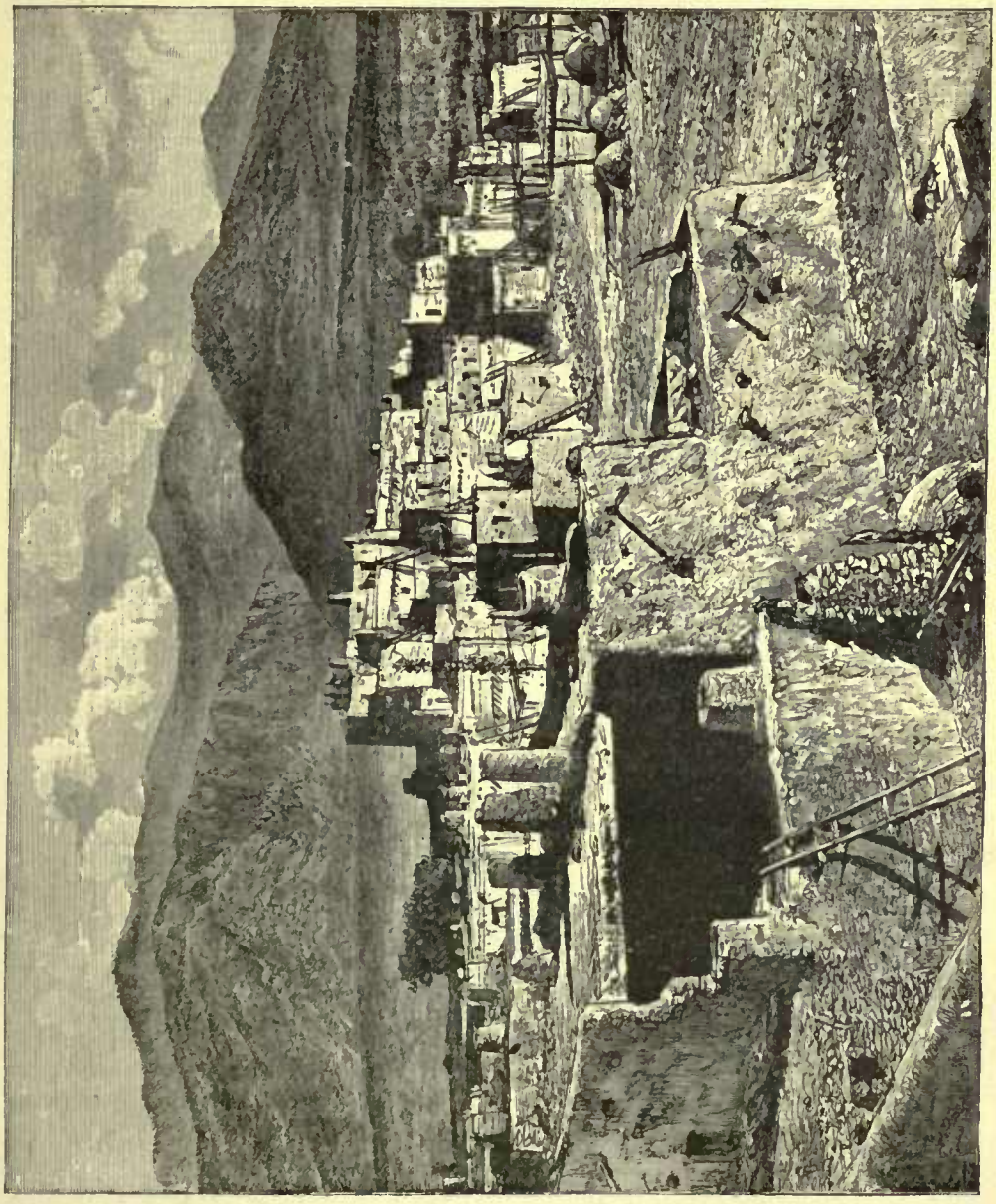


Fig. 20.—Pueblo of Taos.

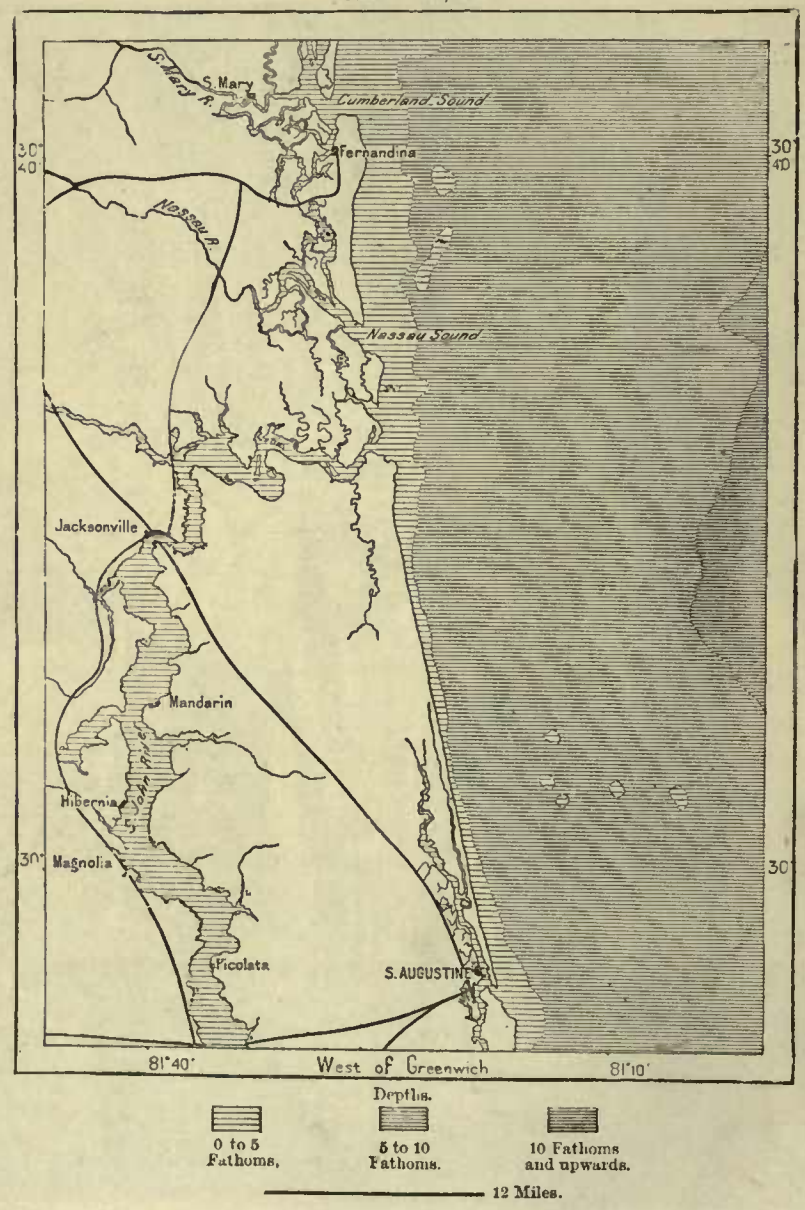
that in which their forefathers were themselves developed. In the veins of the white American flows British (English, Scotch, and Welsh), Irish, French, German, Spanish and Scandinavian blood—mingled, in some cases, with a slight negro and Indian strain.

* John C. Fleming, *North American Review*, August, 1891.

Ponce de Leon, Pamphilo de Narvaez, Hernando de Soto, and their companions, all Spaniards, were the first Europeans who, after the discovery, stood on soil embraced in the present United States, though only to perish or escape at great

FIG. 21.—FIRST FRENCH AND SPANISH COLONIES IN FLORIDA.

Scale 1 : 700,000.

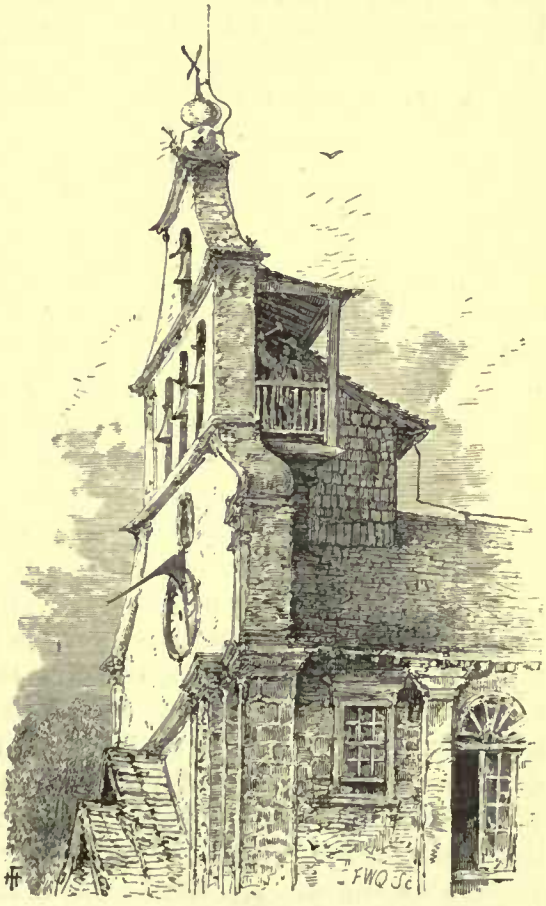


risk. The immigrants, properly so called, who established themselves at the earliest known date within the limits of the present Union were not English but French. Already in the year 1562 the Huguenot, Riband, sent by Coligny, founded a settlement on the south-east coast of the territory still called by him "Floride," but renamed "Carolina" after the English occupation under

Charles II.* The immigrants erected their first cabins on the islet of Charlesfort, perhaps near Lemon Island, on the shores of one of the broad estuaries near which was afterwards founded the city of Charleston. But, reduced by hardships and fever, the twenty-six survivors, resolving to escape, took to the high sea in a rudely-built bark, and after long exposure to the Atlantic billows were at last rescued by an English vessel in European waters.

Two years afterwards Laudonnière, another of Coligny's officers, ascended the course of the Floridan river, May, probably the one now known as St. John, and then erected the fortalice of Caroline on a triangular island. But the following year the Spaniards hastened to repel this encroachment, made on what they regarded as their exclusive domain by right of discovery. Arriving with a whole fleet and over 2,600 men, soldiers and crew, Menendez took up a strong position at San Agustin on the coast; then, having surprised the little group of Huguenot settlers, he butchered them all, "not as Frenchmen but as heretics."

Fig. 22.—The Old Cathedral, St. Augustine, Florida.



Three years later Dominique de Gourgues, a Gascon nobleman, avenged these murders by seizing with a small band the three Spanish forts lying nearest to the site of the massacre, and hanging the defenders, "not as Spaniards but as traitors, thieves and murderers."

The station of San Agustin, the present St. Augustine, still exists; and except the towns that rose on the sites of ancient Indian villages, it is the oldest place in the United States.

The Makers of Virginia.

In virtue of the right of possession based on the Cabots' discovery of the North American Atlantic seaboard, the English Government claimed all the coast-lands at present comprised within United States territory; but for nearly a century the claim remained unsupported by any attempt to actually occupy and settle the land. At last, in 1584, Sir Walter Raleigh received in fief a great part of the coast

* Paul Gaffarel, *Histoire de la Floride française.*

region, to which the virgin queen, Elizabeth, gave the name of "Virginia," in honour of herself, but his three successive essays of colonisation all ended in failure.

Thus at the beginning of the seventeenth century not a single Englishman was resident on the North American continent, which is at present inhabited by so many millions of their race. They effected no footing in the country till the year 1607, that is to say, forty-five years after the landing of the French on the shores of Carolina and Florida. About a hundred persons, led by Wingfield, established themselves on the shores of a peninsula in the estuary of the James River, Virginia, and here founded the settlement of Jamestown, which, however, was too badly situated to prosper. Nothing now remains of this place except the ruins of a church.

The first settlers had been labourers, artisans, and "poor gentlemen," without any profession, and the recruits by whom the Virginian pioneers were joined during the following years belonged to the same social classes. The immigrants were so decimated by famine, sickness and war that, in 1619, twelve years after the foundation of Jamestown, not more than 600 persons were found in the colony.

But after this period the population increased rapidly, thanks to the cultivation of tobacco, which had been introduced from the West Indies. Numbers of respectable young women were sent to the colony from the English ports, and were married to the planters, each planter paying the charges for the transportation of his bride with from 1,200 to 1,500 pounds of tobacco. All the colonists of both sexes were exclusively of English, Scotch, or Irish origin.

The landed proprietors soon cast about for hands as substitutes in the field operations; even before employing negroes imported from the West Indies, they utilised white servile labour for the purpose. These "indented servants" were temporary slaves, who were purchased like pack animals. Agents were commissioned to buy up this human cattle in all the English ports, and to consign them at so much a head; at times they completed their cargoes of men and women by kidnapping people in the streets. The English Government itself fostered this white slave trade by shipping to Chesapeake Bay the prisoners taken during the civil wars. Dealers furnished with full powers became man-hunters, and the English authorities also transported criminals to the American colonies and sold them to the highest bidders.

Thus the Virginian population consisted at first of the most diverse elements. But at the time of the Civil War in England, over forty years after the foundation of the colony, a considerable number of cavaliers, nobles and citizens emigrated to Virginia, and many of these became large landowners. But in 1660, after the Restoration, most of them returned to the mother country. Although the expression "first families of Virginia," the familiar *F.F.V.*, has become proverbial, there can be no doubt that the great mass of the white population in this region is of plebeian origin; it descends chiefly from the first settlers and from the numerous class of indented servants.

What tended above all to make the settlement an aristocratic colony was the employment of black labour on the plantations. In the year 1620 the first slaver

landed its living freight on the banks of the James River. Thus becoming master of human herds, and acquiring a life of ease and luxury, the planters, the magistrates, and the representatives of the districts readily fancied themselves descended from the oldest families of Great Britain. They called themselves "squires," and the state of Virginia still proudly keeps the title of the Old Dominion.

The Makers of New England—The Pilgrim Fathers.

While the colonisation of the Virginian regions had been entrusted by King James I. to an association of courtiers whom their American feudatories accepted as their models, the northern districts bordering on Canada, already known as New England, had been ceded to a company of traders residing for the most part in Plymouth and Bristol. These also made several unsuccessful attempts to turn their domain to profitable purpose.

But from the year 1620 dates the first settlement, which was destined in the history of the nation to have greater importance even than that of Virginia. In that memorable year one hundred and two emigrants, martyrs to the faith, who had first been driven to take refuge in Holland, and who sailed on the *Mayflower* for the mouth of the Hudson, landed at a place which they called Plymouth, in the province of New England. Nine years later three hundred other Puritans arrived at the port of Salem, which commands the north side of the entrance to the harbour of Boston, and thus the settlement went on step by step.

Thanks to the remoteness of the mother country the immigrants enjoyed the inestimable privilege and advantage of self-government. But the fanatical Puritans of Massachusetts aimed at the establishment of a theocratic democracy on the Jewish model. The devout members of the congregation had alone the rights of citizenship; the laws were extended to all conduct and actions, public and private; the Penal Code was terribly severe. Intolerance grew to such a head that the dissidents, compelled to fly, went in search of new homes, and founded Rhode Island, while others settled in Connecticut and New Hampshire.

The harshness of Puritan rule, combined with the rigour of the climate and the poorness of the soil, was not calculated to attract strangers; hence, down to the period of the great modern immigrations, the population of New England remained of a very homogeneous character. It consisted almost exclusively of Anglo-Saxons, to a slight extent mingled with the descendants of Scotch and Irish Presbyterians, and a very small number of indented servants, like those of Virginia, drawn from all quarters. A few French Huguenots settled in Massachusetts after the revocation of the Edict of Nantes; but compared with the mass of the English colonists their number was insignificant. Some negroes were also imported, and after landing the "pilgrims," the *Mayflower* is said to have sailed for Africa to ship a cargo of blacks for the West Indian market.

The Peopling of New York and Neighbouring Colonies.

The populations of the state of New York are far more mixed than those of New England and Virginia. In 1615, several years before the arrival of the

Puritans in Massachusetts, the Dutch had erected Fort Orange on the Hudson, River, near the spot where now stands the city of Albany, capital of the state. In 1623 three hundred Flemings of French speech, from the Avesnes district, were conducted by Jean de Forest to Manhattan Island, which is now occupied by the city of New York; these were followed by some Dutch settlers, who, thanks to the support of the home government, were strong enough to substitute the name of Nieuwe Amsterdam for that of Nouvelle Avesnes, the first title of the settlement which has since become the "Empire City" of the New World.

At first the growth of New Amsterdam was very slow; but towards the middle of the seventeenth century the commercial advantages offered by the port of the Hudson, and the religious toleration established by the Dutch, attracted settlers from various parts of Europe, Jews, French Huguenots, German Lutherans, Swiss, and even Italians. Some English people and Puritans from New England also came to seek a refuge in the Dutch possessions, which rapidly grew in importance and population.

After half a century of existence the colony fell into the hands of the English; but down to the beginning of the eighteenth century the Dutch and even the French Protestant settlers maintained their numerical superiority over the Anglo-Saxon immigrants. From this date, however, the influx from Great Britain gave the predominance to the British element. Nevertheless, the state of New York, owing to the attraction of its trade, has always had a relatively higher proportion of inhabitants natives of the European mainland and of Ireland. Non-English foreigners are reckoned at not less than one-fourth, and to these should be added the Anglicised descendants of the original settlers.

The colony of New Jersey, thanks to the neighbourhood of the great city from which it is separated by the Hudson River, has from the ethnical standpoint become little more than a district of the state of New York. Here also are found representatives of every country in Europe; but the first settlers were almost exclusively English, some Quakers and some Puritans.

English Quakers also form one of the three elements from which the inhabitants of Pennsylvania are mainly descended, the other two being North Germans, nearly all Protestants, and Irish Presbyterians from Belfast and the surrounding district. Although of little numerical importance, the English Quaker section long maintained a preponderating influence. When the War of Independence broke out, the Germans formed no less than a third of the whole population, which at that time was estimated at 30,000 souls. Amongst the inhabitants of Pennsylvania should also be mentioned a few descendants of the Swedes who had founded a settlement on the banks of the Delaware (New Sweden), and some Scotch peasants, besides a number of convicts forwarded by the British Government.

Similar conditions prevailed in Maryland, which, ever since the year 1699, had fully adopted the principle of religious toleration. This state, which about Chesapeake Bay is conterminous with Delaware, while its northern frontier borders on Pennsylvania, is connected ethnologically with both of these states. In the east English and Irish (Roman Catholic) elements are dominant; elsewhere families of German descent are very numerous.

The Peopling of the Carolinas and Central States.

Of all parts of the Union, North Carolina has best preserved the purity of its original white population, which was almost exclusively British and Irish. A few groups of Germans and Swiss alone established themselves at New Berne, and at some other points on the banks of the Neuse. Some Scotch Highlanders also frequently landed at Wilmington, and till a recent epoch several Gaelic-speaking groups continued to maintain themselves in the pine forests of the interior. Since

Fig. 23.—French Inland Colonies in the 18th Century.

Scale 1 : 17,000,000.

◊ French fort or station. • Indian village. o English fort or station.

310 Miles.

the War of Independence foreign immigration to this part of the republic has almost entirely ceased, and many European states, notably France, have a far more cosmopolitan population than North Carolina.

On the other hand, the ancestors of the white inhabitants of South Carolina were of very diversified origin. The first colonial communities were formed by English Puritans, Scotch Presbyterians, Irish, Dutch from New Amsterdam, Germans, convicts, and indented servants from various quarters, while some planters from Barbadoes brought with them their establishments of slaves.

Thousands of French Protestants, expelled from Saintonge, Languedoc, Poitou and Touraine, also sought new homes in this region, the colonisation of which had first been attempted by one of their co-religionists and fellow-countrymen. Most of these Huguenots settled at Charleston and farther north on the banks of the Santee river. But although their descendants form a considerable element in the present population of South Carolina, it is impossible to estimate their number, a great many family names having assumed English forms, while others were simply translated into English.

Georgia, southernmost of the thirteen original colonies, was founded by Oglethorpe in 1732, but its original population was of a far less varied character than that of South Carolina, having been drawn almost exclusively from England, Scotland, Salzburg in South Germany, and Switzerland. The Moravian Brothers also formed an important community in the province.

Kentucky and Tennessee, territories which originally formed part of Virginia, are amongst those states of the Union where the primitive British substratum has been maintained in the greatest purity. The more enterprising colonists, who had penetrated into the heart of the Alleghanies, ascended the parallel fluvial valleys running towards the south-west, and by following these long depressions at last reached the upper Tennessee basin. But immediately to the west the Appalachian foot-hills and the slopes draining to the Ohio were densely clothed with a continuous forest which long seemed impassable.

But in 1775 some adventurous pioneers cut themselves a track through the pathless woodlands. These were soon followed by others who, after a long struggle with the Indians, succeeded in holding their ground and establishing permanent settlements on the "dark and bloody ground" of Kentucky. The descendants of these daring pioneers, later joined by others from Virginia, still reside in the country, where they have scarcely intermingled with other Anglo-Americans or with direct immigrants from Europe, except along the course of the Ohio.

The Settlement of the Mississippi Basin and the Far West.

In the Mississippi basin and the regions stretching thence to the shores of the Pacific the immigrants of Anglo-Saxon race had been preceded, as in Florida, by French and Spanish pioneers. Penetrating southwards from the region of the Great Lakes, the early French-Canadian trappers and half-breeds had founded a few villages here and there in the peninsulas washed by Lakes Huron and Michigan, as well as on the banks of the Wabash and Illinois Rivers. They had even crossed the Mississippi and opened some lead-mines in the Far West.

Then after the year 1699, when they established Biloxi, in Mississippi, they connected their northern with their southern possessions by a continuous chain of fortified posts erected at intervals on the bluffs along the left bank of the Mississippi. The whole of the English territory on the Atlantic slope was thus completely girdled round by a vast semicircle of solitudes, which were claimed by France in virtue of the few stations founded by her colonists and connected together by uncertain tracks across prairie and forest.

Beyond the Mississippi basin, on the Texan seaboard, in the Pecos and Rio Grande valleys, and lastly on the shores of California, all the inhabitants of white race were Spaniards or Creoles of Spanish speech; even still the people of New Mexico claim to be for the most part descended from the followers of Cortes.

But except in New Mexico, and in certain districts of Michigan, Illinois, Missouri and Louisiana, the groups of purely Latin population have long been merged in the flood of Anglo-Americans. Nevertheless, all the fortified stations founded by them served as so many centres of population, abridging by several years the preliminary work of colonisation, by the introduction of agriculture and the pacification of the Indians.

When the colonies of the Atlantic slope had definitely secured their independence, when, free from the scourge of war, they were able to turn their attention to the development of the boundless resources of their territory, the farming classes migrated in thousands and thousands across the mountain ranges and the forest which for a hundred years had served as a barrier to the progress of British colonisation westwards. While these were moving into the fertile regions of the Ohio basin, the Virginians were establishing themselves in Kentucky, and giving birth to that energetic race of pioneers who have become renowned for their cool courage, their presence of mind, and inexhaustible fertility of resource.

At that time the Puritan families of Massachusetts, the farmers of Connecticut and neighbouring states were distinguished for their numerous progeny. Hence a veritable flood of migration set steadily from these regions towards the western plains. No warlike expeditions were ever comparable to this free and peaceful movement of a whole nation in search of new homes.

It has been calculated that towards the year 1850 one-third of the white inhabitants of the Union, say, 8,000,000 altogether, reckoned amongst their ancestors one or more of the 4,000 families who were settled in the Puritan colonies about the middle of the seventeenth century. And how is it possible duly to estimate the far-reaching influence of this element on the destinies of America? Doubtless the "pilgrim fathers" might be called irrational fanatics, but they had risked all, not to go in search of gold, nor to amass wealth by raising colonial produce on slave-worked plantations, but to conquer the right to believe, to live, and to govern themselves in their own way.

At the same time the ethnical composition of the populations spreading over the Mississippi regions has been considerably modified by the great movement of emigration which after the close of the Napoleonic wars has drawn the destitute and adventurous classes of Europe towards the New World, "common refuge of the desperate," as it was called by Cervantes. The blood of the "Bostonian" pioneers has been profoundly affected by the swarms of Germans and Irish, by the English either arriving directly from the home country or overflowing from British North America, by the French-Canadians of New England and the states bordering on the Great Lakes, by the Scandinavians settled in Wisconsin and the neighbouring states, and lastly by Russians, Italians, Portuguese, Azorians immigrating in continually increasing numbers.

In 1848 the occupation of California and the discovery of the gold-fields introduced other additional elements into the circulation of American life. With the representatives of every European nation have been mingled Mexicans, Peruvians, Chilians and other Creoles of semi-Indian stock. The Kanakas (Polynesians) of the Sandwich Islands, the Tagals of the Philippines, the Malays of the Eastern Archipelago, have also entered as chemical ingredients into this laboratory of races; and although the Chinese and Japanese keep generally aloof, nevertheless they contribute, in isolated instances, to the experiment in miscegenation which is being carried on on a colossal scale in the North-American republic.

The Israelites, very rare in the early days of the immigration, have in recent years become one of the most rapidly increasing ethnical elements, and every town has already its crowded quarter of German and Russian Jews. And as if to complete this medley of races and peoples, thousands of Gypsies, mostly from Great Britain, have reached the New World, there to continue their nomad existence. The minglings of the diverse elements of population, even between fundamentally distinct races, adds still new groups to those arriving from every region of the globe in United States territory.

In the presence of these multitudinous races and sub-races, and in our almost complete ignorance regarding the relative fecundity of the various family groups during successive generations under the varying climates, it becomes absolutely impossible to calculate the true proportion of the ethnical elements in the people of the United States. All that can be done is to reckon the number of colonists actually born in foreign countries.

The people of New England, the Yankees properly so called, though this Algonquin designation of the early English settlers has since been wrongly applied to all North Americans, were, before the invasion of their states by the Irish and French Canadians, the purest representatives of the Anglo-Saxon race, that is to say, of the English nationality transplanted to the New World. Hence the term, "New England," given to their states collectively was perfectly justified. Of all the Anglo-Americans those of New England most resemble their English forefathers in their habits, traditions, and family life; they also cherish most filial affection for the old mother-country, entertain the warmest relations with their English cousins, and hold in the greatest respect the precious treasure of their common English speech.

But however strong may still be the ties of kindred and sympathy, considerable changes have taken place during the course of three centuries in the population of New England under the influence of a different environment and in some respects of a new mode of life. As a rule, the New Englanders are thinner and slimmer than the English; they have more decided features, sharper contour lines, thinner lips, more jerky motions, and a more nervous temperament, although, like most other Anglo-Americans, they are relatively cool and masters of their feelings. Hence the nickname, "white-livered," given them by their more excitable fellow-countrymen of the Southern States.

But whatever they may owe to the original stock and to the new environment

in which they have been developed since the arrival of the *Mayflower*, the New Englanders unquestionably take the foremost position amongst the North American populations. To them belongs the intellectual and moral leadership. The list of American authors attests the enormous pre-eminence of New England in the world of thought, letters, and the arts. In the practical appliance of science to the industries the Yankees also hold the front rank.

If they somewhat contemptuously leave to other Americans the chief rôle in noisy electoral contests, in the political arena and popular clamour, they have more than once played the decisive part in the great historic movements of the nation; to them, above all, was due the work of independence. The first appeal to arms took place near their chief city, Boston; from the outset of the struggle they had recovered their freedom and hastened to confer it on their neighbours. The little Yankee state of Massachusetts had alone more soldiers in the Revolution than all the Southern States collectively.

To the moral influence of New England the North American republic was also chiefly indebted for its reconstitution by the abolition of slavery. Thus in the two great national crises the Yankees took the initiative. Their relative importance in the Union, as a whole, must naturally diminish according as the rest of the country becomes more peopled, and the centres of culture, trade, and wealth displaced. But the New England states will still retain their supremacy, at least indirectly, by the ceaseless flow of their emigrants into the newly-settled districts, and by the eminence they have acquired in the general work of public instruction. They have hitherto supplied the rest of the Union with perhaps a majority of teachers of both sexes, as well as with many of the standard text-books.

Just as the New England families have swarmed especially into the regions lying due west of their domain, the Virginians have gradually peopled the Central States of Kentucky and Tennessee, besides largely contributing to the colonisation of those beyond the Mississippi. From eight to ten millions of people would appear to be descended from this stock, although the white inhabitants of Virginia itself do not greatly exceed a million and a half, and even including West Virginia number but little over 2,100,000. But according to Shaler, this constant drain has had the consequence of impoverishing the original stock, impairing its physical strength and moral manhood. The departure of the young and vigorous, leaving behind them the feeble and sickly, and those lacking in enterprise, would appear to have acted injuriously on the primitive race.

But however this be, there can be no question of decrepitude on the part of the Virginian emigrants themselves, notably the inhabitants of the upper valleys of the Tennessee and its affluents. The population of Kentucky even enjoys a far-famed reputation for its physical strength, beauty, and general capacity. These lands, which in the New World most resemble the gently rolling regions of West Europe, are also those in which the European stock has taken most vigorous root. The natives of these Central States have a less stern aspect than the Yankee. Of a genial and kindly disposition, they have nothing of the fanatic in their expression, no rigid sourness of morals; but they are equally active

and versatile, equally eager for gain, and still more open-handed in its expenditure. The most striking contrast between Americans and Americans are those prevailing between the Northern farmers and the descendants of the old planters, such as the "Creoles," especially those of Louisiana, and the *petits blancs* ("little whites") of the South. But these contrasts are mainly due to their different pursuits, the different habits arising from their different social conditions. The Californians, also, may at a glance be distinguished from the Americans of the Eastern and Central States by their greater cheerfulness, vivacity, freedom of manners and morals.

The Irish.

Till recently the Irish element was far more distinct in the Anglo-American social world than it is at present. After the great famine of 1845-6 emigration assumed gigantic proportions. The exodus of the unhappy fugitives from the distressful country consisted almost exclusively of Roman Catholics, who tended, through community of race, sufferings and religion, to gravitate together in separate groups. In 1880, when the stream of emigration reached its high-water mark, 190,000 children of the "Emerald Isle" landed in the United States, and at that date in the whole Union there were reckoned 1,855,000 Irish by birth, and 4,529,000 born in America of Irish fathers. At present the number of direct or indirect Irish settlers is more than double that of the population of Ireland itself.

By a remarkable phenomenon in "ethnical chemistry" these immigrants, nearly all belonging to the peasant class in the home country, generally adopt other pursuits after reaching the United States. While the German agriculturists continue to occupy themselves with the cultivation of the land, spreading over the villages and hamlets from the coast to the Mississippi, the Irish prefer to remain in the large towns or their outskirts. They seek employment as porters, day labourers, stevedores, or navvies; then after scraping together a few dollars they become artisans, contractors, traders, and especially "politicians," taking a vehement part in local politics and sharing in the prizes of victory.

But this new Erin gradually loses its old cohesion; the depopulated mother country no longer sends a large yearly contingent of fresh colonists. Marriages, business interests, the storm and stress of social life tend more and more to merge the Irish elements in the Anglo-American world; and as the Catholic worship has adherents of all races and of all languages in the United States, religion has ceased to have any special influence in fostering the Irish national sentiment. It is a well-ascertained fact that in nearly every part of the Union the Irish have always taken sides politically with the slave party, doubtless through antagonism to their negro competitors in the labour market. During the Civil War the Southerners in their long and stubborn resistance received most encouragement from the Irish of New York and of the other large cities of the Northern States.

The Germans.

The German element in the United States comprises two perfectly distinct divisions—the descendants of the old indented servants and of others introduced

during the British administration, and the free immigrants who have arrived since 1848, a date which marks a turning-point in German history. Nearly all those of the first division were natives of Suabia and the Rhine Valley. As soon as William Penn, at the close of the seventeenth century, had purchased from the Indians the lands destined to become first a colonial province and then the state of Pennsylvania, a number of Rhenish peasantry from the Black Forest, from the Rauhe Alp and Rhineland, began to flock round him in response to his appeal to all the wretched and oppressed of the earth. These pioneers of the colonisation were followed by other immigrants from the same regions and in the same state of extreme destitution. Many had begged their way along the Rhine down to Holland, where they engaged themselves for several years to some ship's captain, who, in his turn, sold them in the labour market of some American seaport.

The terrible winter of 1709 had reduced to the utmost distress the populations of the Rhenish provinces and of the Palatinate districts, which had already been wasted by the wars of Louis XIV., and the occasion seemed favourable for the Government of Queen Anne to engage labourers for the transatlantic colonies. The fugitives came in swarms, far more numerous than had been expected. As many as 32,000 famished Germans encamped in the neighbourhood of London on Blackheath Common. But the Government had made no preparations for their reception, or to protect them against rivals clamouring for work, and naturally hostile to the aliens. All the Roman Catholics were pitilessly sent back to the Continent. Others, despatched in thousands to the right and left, to the North of England, to the Scilly Isles, to Ireland, went about begging for work or for land, which were almost everywhere denied them.

But more than a third of the exiles, about 10,000 altogether, after over a year's delay, at last saw the fulfilment of the royal promise, and were transported to Pennsylvania as indented hirelings, that is to say, temporary slaves. A special class of speculators, known by the name of "soul drivers," became the agents of this traffic, and every town had its market, where the wretched victims were openly sold for periods ranging from two to ten years. Down to the War of Independence, and even in the present century, such hired labourers were sold, and the traffic was at last discontinued, because these labourers, differing in no respect from their task-masters in physical appearance, were able too easily to escape and avoid detection.

No doubt the German settlers in Pennsylvania and Maryland, whether free or engaged, were better grouped than the immigrants from other European countries, and they would have sufficed to build up a new nation had they possessed the least solidarity and consciousness of their own strength. But they were by nature and religion too retiring, too crushed also by misfortune, to assert their nationality with sufficient pride. Hence, they almost everywhere sought advancement in life by sinking their individuality in that of the Anglo-American rulers of the land.

Nor had they maintained any political or commercial relations with the fatherland, nothing beyond some rare family correspondence. The result was that the

majority forgot their mother tongue after the first or second generation. A very large proportion even changed their names, either translating them into English or replacing them by others derived from various sources. Hence it is no longer possible to determine the numerical strength of the German families that helped to people the Central States, and especially Pennsylvania and Maryland.

Those who have preserved their German names and kept up the original provincial dialect, have borrowed so many English terms, required by the new conditions of their existence, that they are quite unintelligible to Germans arriving fresh from Europe. Light literature is rich in works written in this curious jargon, which is neither German nor English, and which gives rise to the most amusing misunderstandings.

The Teutonic immigrants who, from the year 1848, began to swarm into every part of the republic—peasants, artisans, traders, members of the liberal professions—had amongst their ranks men of worth and enterprise in sufficient numbers at once to make their mark as joint workers for the common weal of the American nation. The majority have become fellow-countrymen of the Anglo-Americans by the more or less habitual use of the English language, and by the share they have taken in the social and political life of the people.

These Germans have maintained constant relations with the fatherland, and contribute in a very large measure to the trade that has been developed between New York and Hamburg, as well as between the other seaports of both countries. They have introduced into the States certain German feasts and ceremonies, they sing the national hymns in chorus, cultivate the native literature, and develop it in the schools, theatres, periodical and other publications. They even exercise a powerful influence on public opinion in a sense favourable to themselves, as was made evident during the Franco-German war of 1871.

As regards the proportion of Germans settled in the Anglo-American republic, the estimates vary enormously according to the views taken by different statisticians. In the eyes of several patriots all those are Germans who are born in America of German parents, or even who can trace their descent from German immigrants. Thus are explained such figures as 6,000,000, or even 10,000,000 of Germans mentioned in some works as inhabiting the United States. Other writers, holding less exaggerated views on this subject, class amongst the Germans all the inhabitants of the republic who have preserved their family names and are still able to converse more or less fluently in the mother tongue.

A more reasonable calculation restricts the name of Germans to the immigrants properly so called and to those members of their families whose ordinary language has remained German. This is a far from numerous class, so potent is the attraction exercised by American society on the new arrivals. It may be stated generally that all the children begin by thinking in the English language. Most of the immigrants become rapidly assimilated to the Anglo-Americans, so much so that they soon speak English almost exclusively, even in the family circle itself.

In the absence of special statistics based on the declaration of the citizens themselves, the Teutonic element in the United States may be approximately estimated

at 2,500,000 souls.* The Israelites, who are usually classed either with the Germans or the Russians, should be reckoned apart. They number probably half a million, and their colonies have rapidly increased since the severe administrative measures have rendered existence almost intolerable for the Jews of Russia.

The French, Franco-Canadians, Scandinavians, and Italians.

Compared with the Irish and Germans, the other European nations have taken but a slight share in the peopling of the United States. The colonists who have arrived directly from France and settled chiefly in New York, California and Louisiana, are even less numerous than the descendants of the French immigrants in the seventeenth century, who have become more or less mingled with the mass of the American people. They are especially far inferior to the Franco-Canadians in direct and potent influence on the race.

But these Canadians are not immigrants in the strict sense of the term. Migrating but a short distance from their native country, already too narrow for their expansion, they merely enlarge their domain by following in the wake of the movement which attracts the New Englanders towards the western regions. The general upheaval which displaces the Yankees also displaces the Canadians, who come in swarms to fill the gaps left void by those that have quitted the industrial centres of New England; but they come either with the intention of returning to their Canadian homes, or else of settling in new lands always within easy communication with their kindred on the other side of the political frontier.

The northern part of Maine is already annexed to the Franco-Canadian ethnical domain of the province of Quebec. In some districts of Vermont and New Hampshire bordering on Lower Canada, the element of French origin is also predominant. Every industrial town in New England has, moreover, its Canadian colony, which soon becomes divided into two fractions, one assimilated to the Anglo-Americans, the other that of the "Jean-Baptistes," who have remained loyal to their twig of maple, emblem of their nationality. In Michigan, Illinois, Indiana, Wisconsin and Minnesota, the expansive movement of the Franco-Canadian race is going on, though to a less extent, and in this respect Lower Canada may be compared to a lake gently overflowing its banks.†

* German emigration to the United States from 1820 to 1890:—

1820 to 1830	6,751
1831 to 1840	152,454
1841 to 1850	451,626
1851 to 1860	951,667
1861 to 1870	822,077
1871 to 1880	757,628
1881 to 1890	1,457,000
Total	4,582,203

† French and Canadians in the United States, according to an approximate estimate for 1891:—

Descendants of the French colonists and black "Creoles" of Louisiana	80,000
French immigrants	100,000
Franco-Canadians	820,000
Total	1,000,000

The Scandinavian immigrants—Swedes, Norwegians, Danes and Icelanders, have in recent decades become relatively numerous, and have added a valuable element to the farming population of Wisconsin and Minnesota.

The Italians also, who till recently emigrated exclusively to South America, have found their way to the northern continent. Here their enterprising spirit, the eagerness for gain acquired by misery, their extreme frugality, the ease with which they adapt themselves to the climate, have made them suitable colonists for every part of the Union.

But the great epoch of immigration is drawing to a close. The settlement of the land and the relative equilibrium of the population, henceforth distributed throughout every part of the vast domain, must have the necessary consequence of steadily reducing the influx of immigrants. But while the stream of immigration subsides, the nation as a whole increases. Thus the new arrivals become all the more rapidly merged in the surrounding ocean of Anglo-Americans.

The Negro.

Nevertheless, while the white population tends to become more and more homogeneous, there remains an ethnical element of considerable importance, with which but slight fusion has taken place, and fusion with which is even looked on with horror by the great majority of white Americans. This element is that of the Africans, who already number from seven to eight millions, or about one-ninth of the whole population of the republic.

The African immigration, unlike that of most Europeans, was not spontaneous but forced; all are descended from the Negroes imported by the slavers, and sold like cattle. During their first expeditions to the coast of Florida and to New Mexico the Spanish conquerors were accompanied by slaves. The English colonies in their turn eagerly sought for black labour, and so early as 1620 the Virginians, "by a happy dispensation of Providence," received their first consignment of Negroes from a Dutch shipper.* Soon after the event the traffic, carried on almost exclusively by English slavers, was legally regulated throughout all the British North American colonies.

The sale of Africans, however, was chiefly carried on in the settlements lying south of the Delaware, that is to say, where the land, divided into large domains, yielded tobacco and other colonial produce. The number of Africans transported from Africa or from Jamaica and Barbadoes down to the War of Independence, to all the English colonies north of Florida, is estimated at 300,000. By natural increase this enslaved population would at that epoch have probably grown to half a million, of whom nine-tenths lived south of Mason and Dixon's line.

* It should, however, be remembered, in justice to the Virginians, that in the first instance "the slaves were forced upon them" (G. W. Williams, *History of the Negro Race in America from* 1619 *to* 1880, vol. i., pp. 116, 119); that the first man who ever raised his voice against the slave trade was the Rev. Morgan Godwin, an Anglican minister in Virginia, during Governor Berkeley's administration; and that a petition to the Throne was presented from the House of Burgesses of Virginia, April 1st, 1772, in which it is urged that "the importation of slaves into the colonies from the coast of Africa hath long been considered as a trade of great inhumanity," and more to that effect (see Collections of the Virginia Historical Society, new series, vol. vi., "The Fourth Charter of the Royal African Company," with prefatory note by R. A. Brock, Richmond, 1887).—Ed.

It might have been supposed that the declaration of principles which proclaimed "all men free and equal" would necessarily be followed by the abolition of Negro slavery; but such was not the case. No doubt the revolted colonies reproached Great Britain with having imposed the slave trade on them; but they continued it to their own profit. The shippers of Rhode Island simply took the place of the Liverpool merchants as consigners of human freights, and the Southern planters continued to provide themselves with African labourers.

Of the old provinces Pennsylvania was the first to take steps for the suppression of slavery; in 1780 it abolished servitude for all children yet to be born. The other Northern States successively imitated Pennsylvania by diverse enactments tending in the same direction, and it was even decided that the "Territory north-west of the Ohio" should be later divided into several new free states. But no change was made in the social condition of the slaves in the Southern States, and the Government maintained the freedom of the traffic down to the year 1808.

After this date the slave trade continued to be carried on secretly, nor was the practice placed on a level with piracy till the year 1820. As late as the middle of the century cargoes of Cuban negroes continued to be landed on the coasts of Florida and Alabama. Then the natural increase of the African population by the excess of births over the mortality enabled the planters to maintain their cultivated lands, their opulence, and consequently their power without the necessity of importing fresh hands.

The difference in the institutions, mode of life and interests between the Slave and Free States, which were marked off by a sharply-defined frontier line running east and west, had the natural consequence of giving vital importance to the slave question. It became, in fact, almost the only question, all other factors in contemporary politics being subordinated to this primary subject. The struggle became incessant in Congress, and the Southern politicians, who in the early period of the conflict had felt some reluctance to pose as champions of servile institutions, gradually grew bolder and more energetic in their resistance.

In 1820 they succeeded in getting Missouri added to the Union as a slave state, undertaking, however, by way of compromise, never to demand the introduction of negro labour into the regions lying to the north of 36° 30′ north latitude. Nevertheless, they forgot their promise, and every fresh extension of the domain of the republic gave rise to fresh debates and to more aggressive action on their part. The representatives of the Northern States had even to yield on questions of internal jurisdiction; the vote of 1850 secured for the 113,000 Southern planters the surrender of their fugitive slaves, and a famous decision of the Supreme Court even declared the Negro to possess no rights which the whites were bound to respect. Being more united than their opponents, more accustomed to command, the plantation lords had become habitually victorious in the legislative debates.

But oratorical and judicial triumphs were not sufficient. They needed especially an enlargement of their domain in order to hold their ground against the Northern communities, which had entered a period of marvellous prosperity. France and Spain had ceded Louisiana and Florida, both slave territories; the

political supremacy of the planters had also enabled them to acquire Missouri, while the annexation of Texas, a region vaster than France, was brought about by steady encroachments, attempts at colonisation—though often frustrated, lastly by diplomacy and open war. Nevertheless, all this increase of territory still left them admittedly inferior in industrial development and general wealth. Hence those expeditions of Southern filibusters to the island of Cuba and to Central America (Nicaragua), expeditions which were more than once on the point of succeeding, but which eventually failed, thanks to the resistance of the local populations and of foreign powers, but especially to the refusal of their Northern fellow-citizens to become accomplices in these attempts. There remained nothing for the slave party but to sever the political tie with the Union; this meant civil war, but for such a contingency the Southerners had long been preparing, and when it arose they had the advantage of being able to assume the offensive.

Nevertheless, the elements of resistance had also been gradually accumulating in the North, not only through the clash of interests, but also by the formation of the party of Abolitionists, who demanded the emancipation of the blacks. Local conflicts had taken place in Missouri and Kansas; John Brown and some of his friends had even attempted to induce the Negroes to rise in the very heart of Virginia. Opposition increased with the growing rigour of the "black codes," and especially when the planters, not content to profit by the labour of their slaves, went so far as to proclaim this condition as a sacred principle, in accordance with the Divine will and with the economical results.

Even the churches were fain to take sides. Forgetting that Wesley had defined slavery as the sum total of all crimes, most of the Southern Wesleyans, as well as the members of other denominations, professed to see no harm in rearing slaves, and deprecated all religious propaganda and all brotherly action towards the enslaved blacks. Common political life became daily more and more difficult between the two groups of states; passions grew to a white heat, and the monstrous contradictions tolerated in the Constitution by the founders of the republic at last found their definite solution in the arbitrament of the sword.

Yet a mere glance at the map might have sufficed to foresee the inevitable failure of the attempt at secession made by the aristocracy of the Slave States. In point of fact, the region which they aimed at constituting a distinct empire is separated by no natural frontiers from the Free States of the North. On both sides race, language, and religion are the same, and the only difference was that created by the interests of a class, itself but a small minority of the body politic. The moment the Mississippi, a river traversing the entire territory, had been conquered to its mouth in the Gulf of Mexico, the confederacy of slave-owners necessarily collapsed, rolled up and crushed in the iron embrace of the armies invading it on all sides.

Of their own initiative the Negroes took no part in the war; they nowhere rose in revolt against the planters, but it is estimated that about 300,000 enlisted in the Federal forces. They are now emancipated, but with freedom they could not be endowed with the intelligence and self-reliance necessary to a state

A STREET IN THE CHINESE QUARTER, SAN FRANCISCO.

of real independence. Being thus launched all unprepared on the struggle for existence, they were obliged to take for their motto the proverbial Southern expression, "Root, hog, or die." Endowed with the suffrage by law, they were practically disfranchised in the regions of the South, where they possessed a clear majority, by the shrewder white man, or, if allowed to exercise their political rights, it was only to further the ends of designing politicians. But a brighter era has dawned for the Southern Negro. Separate public schools are maintained for him at the public charge in all the Southern States, and with the gradual diffusion of knowledge a distinct improvement in the condition of the race is discoverable. Though the great mass of the Negroes still finds employment in the lowest positions of manual labour, a constantly increasing number is acquiring land, learning the trades, engaging in commercial pursuits, and even entering the learned professions.

The Chinese.—Problems.—Prospects.

Recently it was also asked whether the destinies of the United States might not be endangered by another question of race. Reference was commonly made to the Chinese immigrants, as if it were feared that a serious yellow invasion might possibly contest with the whites the territory they had scarcely wrested from the Redskins. There is no doubt that the movement of Chinese immigration on the Pacific seaboard acquired a remarkable development during the years that followed the rush of the whites to the gold-fields. San Francisco and every town on the western slope of the Rockies soon had their Chinese quarter, a maze of filthy and malodorous streets, in which shops, fitted up and managed like those of Canton and Shanghai, jostled with substantial American structures.

Chinamen seemed to swarm in all the poor districts, and hundreds were added to their numbers by every vessel arriving from the extreme east. It was asked whether America might not be rapidly overrun by a new race as soon as the "Celestials" began to arrive with their families to settle down permanently, and not merely, as hitherto, as temporary immigrants. These coolies from the banks of the Si-Kiang, however, were not free labourers arriving at their own expense. Recruited by the "five companies," which were represented by a "sixth company" in San Francisco, they came nearly always deeply burdened with debt, so that most of their little earnings went to defray the exorbitant fares of the passage, including, by a shrewd provision, the return journey, either alive or in a fine coffin supplied by the company.

Chinese emigration to California, however, has now been made extremely difficult, if not almost impossible, by means of a severely prohibitive legislation; hence this element, for the moment, no longer threatens to disturb the economic conditions of the United States. But this passing phase of the question is but of secondary importance. The essential point is that a conclusive experiment has already been made, and that an exodus of Mongolians by millions and millions to the New World has been recognised as a possible future contingency. By compelling the Pekin Government to receive and protect the "foreign devils," the Americans at the same time undertook to welcome the "Celestials" on their own territory.

In any case there can be no question of economic or political isolation in times when a single month suffices to reach Europe from the far East by the overland routes across the North American continent. The United States share in all the ebbs and flows of the great ocean of humanity, and cannot keep themselves aloof despite the vast marine waters compassing them on the east and west. They have, however, this advantage, that, taking the world as a whole, they represent such prodigious latent strength that no other power could ever dream of measuring forces with them. Almost without an army, and having at its disposal a fleet of only secondary importance, the Anglo-American republic has nothing to fear from states whose battalions are best organised for attack.

This very indifference to foreign menace makes the strength of the Union. Not only is its political unity no longer threatened, as it was during the Civil War, but if there be any peril, it is rather of an inverse order that may be feared in the too rapid expansion of the North American republic, were that expansion to be other than spontaneous, effected, for instance, by brute force or by the purchase of territory without the consent of its inhabitants.

At the same time, such is their political power that, were the Anglo-Americans to make up their mind for such material enlargement of their domain, they could not fail of any desired success. Will they have the wisdom not to display their strength, and thus give a salutary lesson to other states, amongst whom the eagerness for easy foreign conquests is in direct proportion to their internal difficulties? It may be feared that this dignified reserve may not be always maintained when certain politicians, not satisfied with claiming "America for the Americans," are found agitating for the formation of a "Pan-America," the hegemony of which would be assigned to the Anglo-Saxon republic.

But, owing to the irregular distribution of the population, the United States are hampered with quite special difficulties in developing a homogeneous nationality, and these difficulties are still further enhanced by the discordant ethnical elements with which the administration has to deal. Other and even more serious difficulties exist in respect of the Negroes, for here the country has to deal with a population five-and-twenty times more numerous than the primitive aborigines. To remove all grounds for a possibly pending struggle would involve no less a task than to persuade the Negroes to colonise Africa, or else gradually drive to the West Indies the millions of human beings belonging to the despised race. All these great problems have to be solved, besides those which arise in all industrial lands from the conflicting interests of capital and labour. The terrible war which for four years saturated American soil with blood has removed only a part of the danger, and other no less formidable conflicts may still arise amongst so many hostile elements. But even so, a magnificent future is secured for this energetic section of mankind, which has possessed itself of the whole space comprised between the Great Lakes and the Gulf of Mexico, and which, in a single century, has become the most powerful and wealthiest of all nations.

CHAPTER III.

THE APPALACHIANS AND THE ATLANTIC SLOPE.

I.—The Appalachians.

THE relief of the Atlantic mountains begins far beyond the United States' frontier, for the Labrador and Newfoundland uplands, whose crests stretch along both sides of Belle Isle Strait, all belong to the orographic system which within the territory of the republic takes the name of the Appalachians. But the extreme north-eastern ranges are interrupted by the broad estuary and Gulf of the St. Lawrence, so that the main Appalachian axis, properly so called, has its origin in the Shikshak Mountains of the east Gaspéan peninsula, which develop their long rounded summits along the southern shore of the St. Lawrence. Then diverging from this river, under the name of the Notre-Dame range, they penetrate into Vermont, where they merge in the Green Mountains.

From the Canadian extremity of the Appalachians above Gaspé Bay to the centre of the state of Alabama, where the last crests of the hills disappear beneath the cretaceous and tertiary strata of almost level plains, the total distance is 1,600 miles, not counting the various deflections of the main range. The normal trend of the chain runs north-east and south-west.

The Appalachian system is composed of numerous secondary sections, all differing in direction, form, and relief, but disposed in well-marked northern, central, and southern groups. The northern group, traversing New England, is the oldest, its mass belonging to Silurian and Devonian formations, which are far older than the rocks prevailing in most of the other Atlantic mountains. This group is also by far the most irregular in its outlines, its crests and slopes having for incalculable ages been exposed to weathering, to glacial abrasion, and to the erosion of running waters. The Maine uplands, fringed at their base by a labyrinth of lacustrine basins; the Green and the White Mountains, facing each other across the intervening Connecticut river-valley; the Taconic and Hoosac ranges, which are disposed north and south, parallel with the fluvial depressions—all these rugosities of the surface constitute so many perfectly distinct sub-groups, resting, however, on a common pedestal, which slopes in one direction towards the Hudson and the St. Lawrence, and in the other towards the Atlantic.

Farther south-west the continental breach now flooded by the waters of the Hudson represents an old marine inlet forming a real break in the system. A rising of not more than 200 feet in the sea level would suffice for the St. Lawrence to communicate through the reservoir of Lake Champlain with the ocean, while a second rise of 250 feet would connect the basin of Lake Ontario with that of the Mohawk and the Hudson rivers across the present waterparting. Within this triangular space, limited north-west by the St. Lawrence, south by the Mohawk,

Fig. 24.—Axis of the Appalachian System south of the Susquehanna.

Scale 1 : 11,000,000.

east by Lake Champlain and the Hudson, stands the Adirondack plateau, a detached mass of the northern Appalachians traversed by parallel ridges.

The middle section of the Appalachian system begins in the state of New York with the Catskills and the Highlands. At first forming a relatively narrow range, it gradually expands in Pennsylvania over a vast space, developing numerous folds and ridges, which present a remarkable uniformity in their form, height, escarpments, and general trend. All these parallel chains are carved into short sections by the streams descending to the Atlantic.

This part of the Appalachian system has received the collective name of the Alleghany Mountains, while the main range, lying nearest to the Atlantic coast, is known as the Blue Ridge. Between the two basins of the river Roanoke,

flowing to the Atlantic, and of the Kanawha, running through the Ohio to the Mississippi, the inequalities of the chain, with its windings and ramifications, indicate the beginning of the southern Appalachians, where the whole system culminates in the Black and the Smoky Mountains.

In their general disposition the northern and central sections are slightly curved so as to present their convex side north-westwards towards the depression of the St. Lawrence and Ontario basin, whereas the southern Appalachians are, on the contrary, somewhat curved in the reverse direction.

In most mountain ranges the dominant summits are situated about the centre of the system. Not so in the Appalachians, whose highest peaks rise symmetrically towards both extremities, northwards in the White Mountains, where Mount Washington has an altitude of 6,300 feet, southwards in the Black Mountains, where Mitchell's Peak rises 411 feet higher. The Alleghanies towards the middle of the system have a mean elevation of 2,000 feet.

By a similar contrast the loftiest of the parallel ridges lies not in the middle but rises on the east side immediately above the plains of the Atlantic slope. Thus the Blue Ridge, facing seawards, maintains its position as the Appalachian chain in a pre-eminent sense. A broad and deep longitudinal valley disposed from north-east to south-west between the parallel ranges has given rise to the statement that, at least in the Alleghanies, the positive axis of a central ridge has been replaced by a negative axis, that is to say, by a depression through which flow the affluents of the Ohio and Atlantic. The upper strata, which were formerly developed towards the centre of the axis to many times the present height of the ranges, were less compact than the compressed rocks of the synclinal foldings, and during the long work of erosion those softer rocks at last disappeared, leaving exposed the old foundations.

When studied in detail the various sections of the Appalachian system are found to constitute so many little worlds apart. In the state of Maine the highlands, which partly serve as the frontier-line between the Union and the Dominion of Canada, are rather an irregular divide than a mountain range connected by a distinct backbone with the Notre-Dame Mountains of Lower Canada. Farther south the ground rises gradually towards the centre of the state, and here a group of rounded Silurian crests, with a mean altitude of from 2,000 to over 3,000 feet, stands on a pedestal about 650 feet high, which is scored by lacustrine depressions filled with pure fresh water. Mount Katahdin (Ktaadin), an almost completely isolated granite peak, 5,200 feet high, commands a superb prospect of the surrounding woodlands.

Towards the sea the Silurian rocks which formerly overlaid the granitic framework have disappeared, leaving completely exposed the original crystalline formations carved into rugged cliffs and headlands. A few eruptive rocks also skirt the seaboard, forming promontories and islands, and culminating in the island of Mount Desert, in Green Mountain, 1,522 feet high.

West of Maine the White Mountains, so named because snow-clad for a great part of the year, continue the main system, but here acquire far more the

aspect of a decided mountain range. They form the culminating mass of the northern Appalachians, and thus correspond symmetrically with the Black Mountains at the other extremity of this orographic system. The bold crests of the White Mountains, which have been scaled more frequently than any others in the United States, have earned for them the names of men illustrious in the annals of the republic—Washington, Lafayette, Jefferson, Madison, Adams, Monroe, Franklin, and the whole mass even takes the collective title of "Presidential Range."

The highest peak, to which has been reserved the name of the "Father of his Country," rises in almost solitary grandeur near the frontier of Maine. With the natural tendency of all peoples to exaggerate, the inhabitants of the seaboard estimated the height of Mount Washington at over 10,000 feet in the last century; but according to Pickering its altitude is exactly 6,288 feet. One of its rocky walls has a vertical height of several hundred yards, and its base is scored by deep "notches" or ravines, along which wind the tracks leading to the summit. One of them has even been followed by a railway which has already crept up the precipitous slopes of this central watch-tower of New England. From the top are visible the long line of lower peaks, and the Green Mountains, flanking the upper Connecticut valley. North-eastwards the extreme horizon is bounded by the blue crest of Katahdin, while south-eastwards spread the sparkling waters of the Atlantic Ocean.

South of Mount Washington follow the uplands skirting the long valley of the Connecticut, where are distinguished the crests of Sunapee (2,683 feet), Monadnock (3,186), and Kearsage (2,943), isolated peaks at one time forming part of a connected system, whose crests have been partly levelled by glacial action, and whose valleys have been filled with moraines. In the interior of Massachusetts the highest summit of this series is Mount Wachuset (2,108 feet).

The Connecticut valley was formerly crossed by a ridge of trap rock, whose surviving fragments, Tom in the west and Holyoke in the east, have received the name of mountains, although scarcely exceeding 1,200 feet in height. Holyoke terminates in a cluster of trap columns, which command one of the grandest views in New England.

If the White Mountains are to be regarded as a prolongation of the uplands culminating in Mount Katahdin, the Green Mountains of Vermont may even with better reason be considered a southern continuation of the Notre-Dame range of Lower Canada. As such they belong to the main chain of the Appalachian system, whose first risings begin with the continent itself south of the Gulf of St. Lawrence. But the Green Mountains have not the normal direction of the Appalachian Mountains, for instead of running north-east and south-west they trend rather north and south. They are also far inferior in elevation to the White Mountains, Mansfield, their chief summit, being only 4,430 feet high. But, on the other hand, they develop a much longer continuous range, extending under different names nearly to the sea-coast. To this southern extension of the Green Mountains belong the crystalline marble heights known as the Berkshire Hills, which traverse the county of that name in Massachusetts.

Above the deep valleys where the headwaters of the Housatonic have their source rises a group of hills culminating in Greylock, whose twin-crested white marble peak rises to a height of 3,535 feet. A superb view of lakes, woodlands and rolling plains is afforded by the so-called "opes," that is, openings or vistas through the forest-clad slopes of these hills. Here have their origin two parallel ridges, the Hoosac on the east, and the Taconic (Taghkanic) on the west, both equally famous for their charming sylvan scenery.

The Hoosac is pierced by the longest railway tunnel in North America (8,360 yards). Like the Taconic it is formed of old sedimentary rocks resting on an archaic foundation The geological problems associated with the "Taconic system" have given rise to so much warm and even angry discussion amongst naturalists that a chart representing the Taconic of the state of New York, prepared by Emmons, and 3,000 copies of which had been struck off, remained unpublished for 30 years It had been hidden by some unknown persons interested in maintaining opposite views on the succession of the geological series.

The Highlands, by which the Taconic chain is continued south-westwards and through which the Hudson has cut a winding gorge on its seaward course, merge farther south in the low ridges of the eastern Appalachians traversing the states of New York and New Jersey. Along the eastern base of these ridges narrow lines of eruptive rocks of Triassic age appear above the surface and have been developed in the form of long ramparts overlooking the low plains of the seacoast. Such are the Palisades, which flank the Hudson estuary west of New York, separating it from the marshy plains of the Passaic; and the Orange or Watchung Mountains of New Jersey.

The Adirondacks.

The triangular space formed by the St. Lawrence, Lake Champlain, and the Mohawk valley, is occupied by the Adirondack group, which affects the form of a flattened pyramid. On all three sides the slopes rise insensibly towards this mountain mass, whose crests rise little above the common pedestal. Mount Marcy (Tahawus), the culminating point, has an altitude of 5,379 feet.

As in the uplands of the state of Maine, lakes and tarns are so numerous amongst the Adirondacks that the highlanders are accustomed to equip their canoes, or light boats, to pass from valley to valley. Strangers are surprised at the novel spectacle of people toiling overland with this curious encumbrance of boats and paddles; but so well acquainted are the canoeists with the topography of the district that they are able to make most of the journey by water. On reaching the extremity of a flooded lacustrine valley, they have only to cross some intervening isthmus to resume their aquatic journey.

The finest scenery is found, not in the heart of the mountain mass, but on the periphery, where striking contrasts are presented between the plains and the escarpments. Such is the "Gate of the Adirondacks," a superb gorge through which the Au Sable, so named from the fine sand carried down by its current, escapes from the hills to reach the west side of Lake Champlain. Few ravines offer a more romantic aspect. The rocky walls, vertical or even overhanging, and

formed of regular strata, some projecting, others retreating, according to their strength of resistance to the erosive agencies, develop vast cirques at every abrupt turn in the winding stream, while sudden openings in the frowning cliffs reveal at intervals wide vistas over the gloomy woodlands.

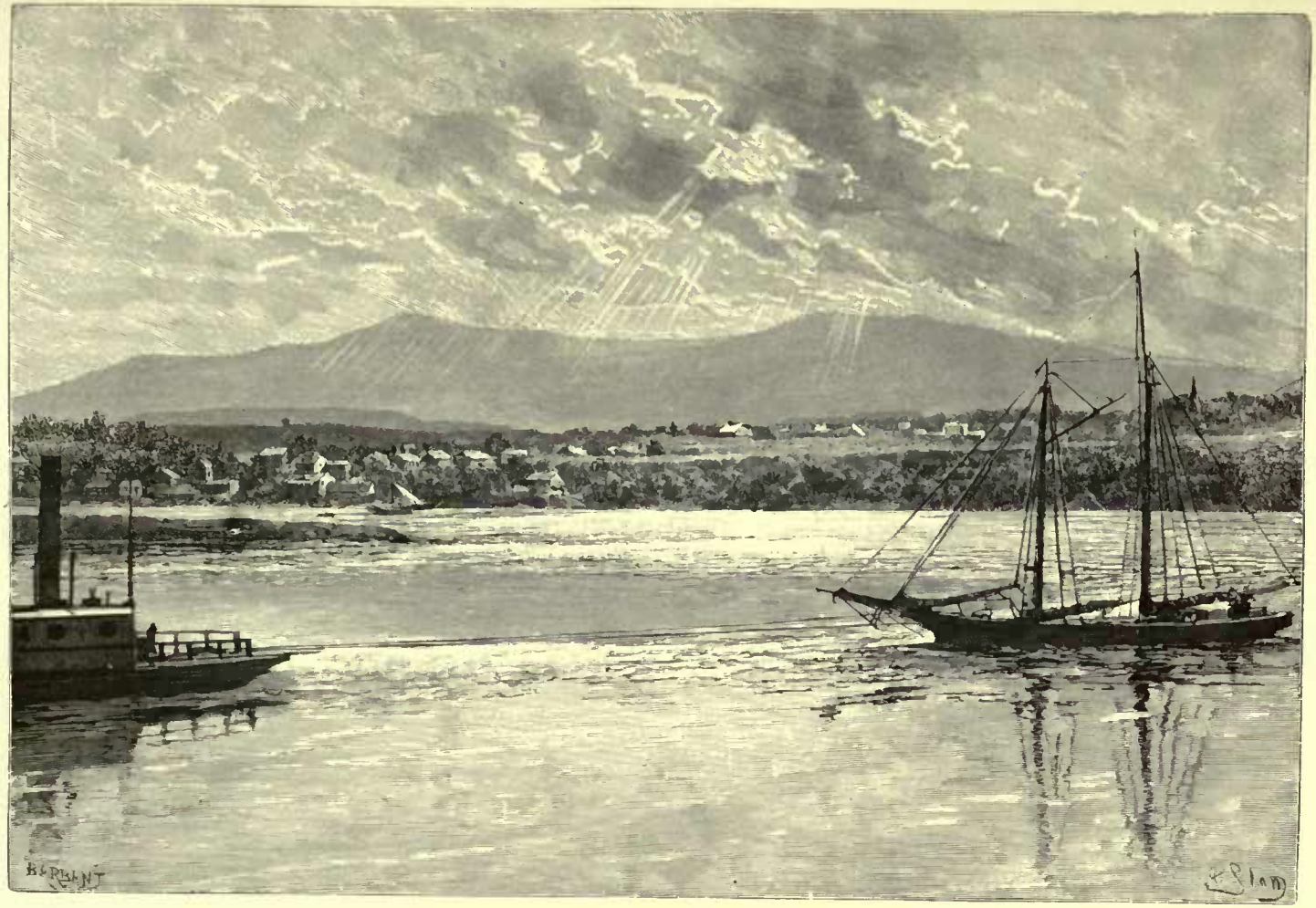
These magnificent forest trees are threatened with complete destruction by the woodman's axe. They may, however, be saved by the fact that the farthest headwaters of the Hudson have their rise in the Adirondack hills. Hence it has been

Fig. 25.—Adirondack Mountains.
Scale 1 : 1,800,000.

proposed to enclose the whole region as a national park like that of the Yellowstone Valley. The preservation of the forests would have the farther advantage of regulating and controlling the discharge of the running waters.

The Catskills.

Beyond the Mohawk, in the angle formed by its confluence with the Hudson, the first Appalachian heights, known as the Helderberg Hills, are of very moderate elevation; but farther south the Catskills assume the aspect of mountains. These



THE CATSKILL MOUNTAINS—VIEW TAKEN FROM THE HUDSON.

highlands still bear the name given them by the Dutch predecessors of the English settlers in the country. The Catskill river, which falls into the Hudson at the east foot of the mountains, was so named from the numerous wild cats which at that time frequented the forests near the river.

Being of difficult access and densely clothed with timber, these uplands were long avoided by the colonists along the banks of the Hudson and Mohawk rivers They figured on the maps as a shapeless mass without any clearly determined outlines; only from their position along the main axis of the Appalachians it was seen that they belonged to the great eastern range of the United States. But since their careful exploration, begun in 1862 by Arnold Guyot and his pupils, their true form has been gradually revealed, and accurate charts of the Catskills, with sections and regular profiles, have now been made.

The essential point, clearly established by Arnold Guyot, is that the Catskills are disposed in inverse direction to the normal trend of the Appalachian ranges. While the whole system and most of its sections run north-east and south-west, the Catskills, on the contrary, are developed in the direction from north-west to south-east, parallel with the course of the rivers Catskill, Schoharie, and Esopus, rising in their valleys. Nevertheless the curious fact is well established that the three culminating peaks—the Black Dome (4,003 feet), Hunter Mountain (4,038), and Slide Mountain (4,205), are disposed north-east and south-west in a line with the main Appalachian axis, although belonging to different ridges.

Viewed as a whole, the Catskills, which are much more elevated than all the other uplands in the triangular space limited by the Hudson, the Mohawk, and the Delaware, rise like a lofty citadel above the surrounding hills and plains. The eastern extremity stands out boldly in distinct promontories, whereas the western parts of the system are gradually effaced beneath the undulating strata of the plateaux. The three parallel chains are sharply limited by intervening watercourses. Thus we have in the north the ridge comprised between the river Catskill and the upper Schoharie; in the centre the Catskills proper bounded by the same upper Schoharie valley on one side, and by that of the upper Esopus on the other; lastly, south of the Esopus, the Shandaken range.

Besides the gateways opened by these fluvial valleys into the heart of the mountains, a few deep gorges, whence foaming torrents tumble over cascades down to the lower reaches, give access to the higher crests, which take the form of regular forest-clad domes. These rocky gorges are locally known as "Cloves," a corruption of the term *Kloof* given to them by the early Dutch settlers.

The Alleghanies.

South-west of the Catskills the Appalachian system seems at first almost completely interrupted, but the ground soon begins gradually to rise in a series of undulations resembling ocean billows, their general uniformity unbroken by any conspicuous eminence. South Mountain, or "First Belt," as the first great stony billow is aptly named, develops a low rolling crest which reaches altitudes of about 1,000 feet, though it is worn down much lower between the Delaware and

Susquehanna rivers. Then follows the broad valley, the Kittatinny valley of New Jersey, the Lebanon and the Cumberland valley of Pennsylvania, but called simply "The Valley" through Virginia, which constitutes the true axis of the Appalachian system, being disposed in the normal direction from north-

Fig. 26.—The Great Shenandoah Valley.
Scale 1 : 325,000.

east to south-west, while gradually rising from 160 in the north to more than 2,000 feet in southern Virginia.

On the north-west rises another parallel ridge, the second great chain of the Alleghanies, which, in New Jersey, like the central valley, bears the name of Kittatinny, that is, the "Endless Range," while through Pennsylvania it is called Blue Mountain. Higher than the eastern chain, in New Jersey and Pennsylvania it attains in its upper crests an elevation of from 1,300 to 1,500 feet, gradually rising to upwards of 2,500 feet in central Virginia. South of the Potomac, however, the southern prolongation of South Mountain, under the name of Blue

Ridge, becomes the dominant chain, and contains several peaks about 4,000 feet high. Despite the moderate altitude of the Blue Mountain of Pennsylvania, it presents a somewhat bold aspect, thanks to the abrupt slope of its escarpments, to the precipitous walls here and there breaking the uniformity of the rolling heights, and to the forests, or at least brushwood, still clothing the rocks and by their dark tints contrasting with the more delicate verdure of the alternating grassy and cultivated tracts on the surrounding plains.

Although on the whole extremely regular, this second great ridge of the Alleghany chains is broken at intervals by abrupt breaches, some, the so-called "wind gaps," simple surface depressions penetrating to no great depth into the rocky crust, others, the "water gaps," profound chasms through which the streams wind from valley to valley. But the wind gaps themselves are also old water gaps excavated at a remote epoch, when the work of erosion was in a less advanced state than at present. Then these depressions were afterwards abandoned by the running waters, when gaps at a lower level offered them a more easy seaward issue.

North-west of the Blue Mountain occurs a series of many parallel chains of a nearly uniform height of about 1,600 feet, separated by corresponding valleys, which are themselves again divided into distinct depressions by minor intervening ridges. Many of these chains are arranged *en échelon*, and not infrequently the overlapping ends of two adjacent chains are connected by an intervening range, thus giving a very peculiar zigzag course to the crest line of the combined mountain. In other instances adjacent chains converge and coalesce at either end, enclosing one of the numerous canoe-shaped valleys which form a characteristic topographical feature of the region.

The zone of parallel chains is defined and walled in on the north-west by the precipitous and elevated eastern edge of the Appalachian plateau. This escarpment maintains a general elevation of from 2,000 to 2,500 feet, and from it the plateau declines gradually to the north-west, until it finally merges in the plains of the Mississippi valley. The plateau is everywhere deeply and intricately eroded by streams, and in West Virginia it is cut across completely by the valley of the Kanawha. With this exception it presents a region of continuous highland from the Mohawk-Hudson valley in central New York to the Tennessee gorge near the boundary of Alabama.

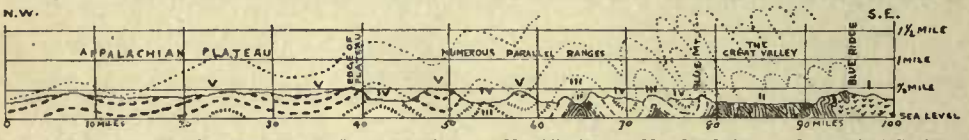
Transverse geological sections of this portion of the Appalachian system, from the Blue Ridge to the Mississippi slope, while differing in details with their location, yet resemble each other closely in their more general features and afford a key to the intricate arrangement yet grandly simple structure of this interesting system of mountains. The rocky strata of the whole region has been thrown by subterranean forces in the remote past into a succession of great waves or folds whose longitudinal axes correspond in direction with the main axis of the system, and which increase gradually from low and open undulations in the north-western plateau to enormously high and closely compressed folds in the Blue Ridge. The erosion of countless ages has truncated these rock waves and has removed a thickness of half a mile or more from the plateau, but of as much as five miles from

some parts of the more highly plicated strata in the neighbourhood of the Blue Ridge. The present parallel ranges are simply the protruding strata in the sides or troughs of the folds, which, by reason of the superior hardness of the rock or of the greater stability afforded by a synclinal position, have been better able to resist the elements than the strata of softer rocks or of less stable anticlinal position which constitute the intervening valleys. Owing to the greater erosion in the south-east, the age of the surface rocks increases progressively in that direction, so that in traversing the region one crosses in succession the upturned edges of the whole series of paleozoic strata, from the more recent carboniferous sandstones of the plateau to the highly metamorphic sub-Cambrian gneiss of the Blue Ridge.

Besides the foldings, which give the ridges as a whole such a surprisingly symmetrical form, the Alleghanies show in their inner structure the traces of other movements which remained concealed in the depths of the rock until revealed to geologists by the extensive mining operations in Pennsylvania. Such are the sudden dislocations and the faults which in some places have caused formerly continuous strata to break away to distances of hundreds and even thousands of yards from their original position.

In the Pennsylvanian section of their ranges the Appalachians, here cut into separate blocks by the two forks of the Susquehanna, present as a whole a certain

Fig. 27.—Generalised Transverse Section of the Appalachian Mountains in Pennsylvania.



Age of Strata: V.—Carboniferous. IV.—Devonian. III.—Silurian. II.—Cambrian. I.—Ancient Gneiss.
The light dotted lines indicate the strata removed by erosion.

convexity turned towards the north-west. But in the Virginias, beyond the gaps traversed by the Potomac, the Appalachian system sweeps off in a curve which presents its convexity to the south-east. The common pedestal here stands at a higher elevation; the long intervening depression, which forms a southern extension of the Kittatinny Valley, and which is here known simply as The Valley, standing at a higher mean level, and maintaining an average breadth of from 15 to 18 miles. The parallel chains are also more elevated, and exceeding 3,000 feet in their highest crests, while Stony Man, Hawk's Bill, Peaks of Otter, and other summits of Blue Ridge exceed 4,000 feet.

The whole region is normally disposed in longitudinal belts of no great width. Such are on the Atlantic slope the foot-hills designated by the French term "Piedmont," farther west the Blue Ridge, then the Great Valley, beyond which follow still other ranges, the chief of which are the Cumberland Mountains forming slopes which drain towards the Ohio and its affluents. The most abrupt of the escarpments, densely clad with dark woodlands, takes the name of Alleghany or Front Mountain. In certain districts as many as twenty successive ridges may be counted within a breadth of 30 miles, each some hundreds of yards higher than the intervening depressions. But in West Virginia the eastern edge of the plateau in many places loses much of its usual regularity.

The southern section of the Appalachian system traversing Tennessee and North Carolina has no longer the regular outlines which suggest the lines of caterpillars moving in procession, or of troops defiling in regiments and battalions. Several ridges converge so as to form irregularly outlined masses; others deviate from the normal direction, their crests running north and south, or east and west; some even stand completely isolated, bounded on all sides by deep valleys. It is here that the Appalachian system presents the greatest diversity of contours, here also it assumes its boldest aspect and attains its highest elevation.

The culminating summits spring from the chain lying nearest to the Atlantic, which continues to bear the collective name of Blue Ridge, but which in reality consists of numerous secondary groups and chains with distinct designations. Such is Roan High Knob (6,313 feet), which farther east is rivalled by the plateau of Grassy Ridge. The Black Mountains, so named from their forests of *Abies nigra* and other dark-leaved conifers, and the Smoky and the Unaka Mountains, all rise to heights of over 6,500 feet. This is some hundred and thirty feet lower than Mount Guyot, whose name commemorates the foremost explorer of the system; Clingman's dome reaches 6,619 feet, and according to the new topographic chart of the United States, these altitudes are exceeded by Mitchell Peak (6,711 feet), which is isolated on the east and west sides by broad depressions.

All these uplands are wooded to the top, except where the summits exceed 5,000 feet. Such apparently bare crests are locally called "balds," a term by a popular etymology corrupted to "balls." But they are not really bald, being covered with scrub, ferns, wild gooseberries, and other berry-growing plants, and higher up by succulent herbs, yielding excellent pasturage.

These southern Appalachian groups, unrivalled for their picturesque scenery and varied floras, are scarcely known compared with the New England uplands, which are both less elevated and less rich in vegetable species. Their apparent neglect is, however, solely due to the still somewhat scanty population of the southern states, the attraction exercised by romantic sites and landscapes depending in a large measure on the social condition of the neighbouring lands.

Beyond the Carolina highlands the ranges fall rapidly; nevertheless, even in Georgia the southern prolongation of the Appalachian system is still marked by numerous peaks, exceeding 3,000 feet in height. The groups of the Enota, Tray, and Blood Mountains, and lastly, Adam's Knob, are respectively 4,798, 4,404, 4,466, and 3,588 feet high. The numerous headwaters of the Coosa, main branch of the Alabama, have their sources in these different groups, and the valley of this river forms the most remarkable physical feature in the Appalachian system. It may be regarded as forming a southern continuation of the main axis, the Coosa and neighbouring streams flowing between escarpments which in many places assume the aspect of mountains. On both sides the parallel slopes, which correspond in all their projecting and retreating contour lines, shoot up so precipitously that they might be taken for the pedestals of magnificent peaks. But on surmounting the upper crest, as seen from below, the traveller finds himself on an almost horizontal plateau.

From the summit of the chains on the Tennessee-Carolina boundary one looks north-westward across the broad Valley of East Tennessee, sixty miles to the bold escarpment of the Appalachian tableland, here called the Cumberland plateau, which though greatly reduced in width, still maintains an average elevation of nearly 2,000 feet, and preserves the same general peculiarities of geological age and structure which characterise it in Pennsylvania. The intervening Valley of East Tennessee is a continuation of the Valley of Virginia and of the zone of parallel ranges; the latter, however, have here subsided into ridges which, while maintaining the same remarkable parallelism, seldom attain greater altitudes than 1,300 to 1,500 feet. The floor of the valley declines south-westwardly from about 1,000 feet in the vicinity of Knoxville to about 650 feet at Chattanooga, where the Tennessee River enters its gorge through the Cumberland Plateau.

The true southern termination of the Appalachians, if not as regards the invisible underlying rocks, at least in respect of their outcroppings, is the point in Central Alabama where the plateaux of secondary formation take the place of the uplands formed by the older strata that constitute the geological structure of the whole system right away to the Gulf of St. Lawrence

All the eastern zone consists of granite and eozoic and paleozoic formations of great age, so old that it has given currency to the oft-repeated saying that the New World is in reality the older of the two; at least here have been found fossil remains of the most remote epochs. Many geologists think they have detected in gneiss itself a species of foraminifer, to which they have given the name of eozoon, "dawn of life." But granting that there may here be a delusion, Braintree's trilobite (*paradoxides Harlani*), discovered in the rocks in the outskirts of Boston, would still appear to be the oldest known organism of the whole terrestrial fauna.

Farther west various Appalachian chains consist of Silurian and Devonian strata, while all the western section of the system belongs to the carboniferous ages. We know how vitally important for the peopling and the industrial progress of this region have been the stores of fuel deposited amid the various strata of the older formations, stores all the more valuable that rich veins of excellent iron ores occur in continuous zones along nearly all the ranges of the Appalachian system.

The coalfields found east of the mountains in small elliptical basins in Virginia and North Carolina belong to the Jurassic epoch. They were deposited in granite beds, and since their formation they have been subject to such profound disturbance that mining operations are here attended by great difficulty. The anthracite deposits that have been found in the northern Alleghanies belong to a very different epoch, resting on paleozoic rocks, and forming quite distinct zones Disposed along the ranges, they are now separated from each other by vast spaces where coal had also been deposited, though all traces of its presence have since disappeared, owing to the work of erosion continued throughout long geological ages.

The anthracites of Pennsylvania were formerly prolonged north-eastwards across the States of New York and Connecticut, and merged in the formations of the same class still persisting in Rhode Island. Perhaps not a hundredth part of the enormous mass of anthracite originally accumulated in this section of the Appa-

lachians still remains. But west of the highlands, that is beyond the scene of the geological events by which the Alleghanies have been folded, distorted or ground down, regular strata of bituminous coal stretch in continuous sheets of vast extent throughout West Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee, and Alabama. The only complete breaks occur in the deep valleys of the Kanawha in West Virginia and of the Tennessee River below Chattanooga.

Gradual transitions in the composition of the coal take place in the direction from east to west. The anthracites of the eastern districts contain only from two to five per cent. of gas and burn with little flame or smoke, whereas the western bituminous coal contains from 20 to 40 per cent. and burns with a bright flame, giving off an extremely dense black smoke. Hence the contrast in the character of the factories using the two descriptions of fuel. In the Susquehanna valley the atmosphere remains unpolluted; in that of the Monongahela the industrial centres incessantly vomit clouds of black smoke.

Evidently the difference in the two kinds of coal arises from their geological history. The bituminous coal, having remained comparatively undisturbed in the position in which it was originally deposited, has preserved its primitive composition intact. The eastern beds, on the contrary, having been profoundly disturbed, and involved in closely compressed folds, the gas has been squeezed out and the coal thus transformed to anthracite. Moreover, the eastern slopes of the mountains contain none of those deep wells of rock oil, nor any of those reservoirs of gas, which characterise the subterranean geology of the Upper Ohio basin.

II.—Rivers of the Atlantic Slope.

The running waters which descend from the Appalachians in one direction towards the Atlantic, in the other towards the Mississippi and the great lakes, continue in a humble way the geological work of trituration and erosion which was begun after the retreat of the ice cap at one time covering the northern continent as far as and beyond the Hudson. Geologists have long been aware that the northern regions of the United States were formerly covered, not once, but twice, by a thick sheet of ice; they have, moreover, verified the fact that these moving crystalline masses transported huge boulders and thrust forward enormous frontal moraines.

On the Atlantic seaboard the whole of New England, with its peninsulas and islands, belongs to this zone, and judging from the height of the ice scratchings observed on the slopes of the mountains, the thickness of the ice-cap formerly spread over South Connecticut may be estimated at over 1,600, perhaps at even 2,300 feet. The refuse brought down crossed the deep valley of the Hudson, and after traversing New Jersey crossed Pennsylvania into south-western New York, surmounting the parallel chains of the Alleghanies and overflowing on the upper strata of the western Susquehanna valley. Certain granite boulders now found in Massachusetts belong to the New Hampshire mountains; other granite blocks landed on the sandstone formation of the Pocono plateau 2,000 feet above the sea, in eastern Pennsylvania, must have been detached from the Adirondacks or the Notre-Dame range of Lower Canada. In the upper Alle-

ghany river valley at an elevation of about 1,900 feet are shown other boulders, whose original home is at least 250 miles away.

The period of transition between the glaciers and regular watercourses is still far from completed in the northern part of the United States. South of the St. John, whose upper affluents belong to the Union, and of the St. Croix, which forms the north-east frontier towards New Brunswick, these watercourses are rather chains of lakes connected together by mere emissaries than normal rivers. The lacustrine period which followed the ice age still continues in Maine, where every valley, every glen has its lakes. So also every plateau, every hill-side has its flooded depressions, its swamps or bogs, half dry during the dry season, but swollen during the rainy and foggy weather so frequent in those regions.

A landslip, a cliff eroded by the under-wash, suffices to divert the affluents from one river to another, and frequently the waters overflow on both sides at once like those of a basin in ornamental fountains. All these lakes ramify in lateral channels through the valleys winding between the mountain masses; but, as a rule, they are disposed in the direction from north-west to south-east, following the general tilt of the land, and their outlets descend step by step, that is from lake to lake, at right angles with the sea-coast.

Of all the watercourses which thus flow from the Height of Land, the most copious are the Penobscot, whose headwaters descend from the slopes of Mount Katahdin, and the Kennebec, which rises in Moosehead Lake, the largest basin in Maine, and which is doubled in volume by the junction of the Androscoggin just above the common estuary. Farther south follow the Saco and the Merrimac, which receive their first supplies from the White Mountains.

In Massachusetts and Rhode Island the maritime slope is too narrow for the development of large streams; hence they assume the aspect of copious rivers only at their mouths under the action of the marine tides. But west of the White Mountains a large breach enables the waters of the highlands to escape southwards as a "long river;" such would appear to be the meaning of the Indian word Awonektakat, or Connecticut, which, however, has also been explained as the "River of Pines."

The course of this river from the Canadian frontier to its mouth in Long Island Sound exceeds that of all other New England streams. Its valley is far more regular, and the terraced lakes of its primitive basin have nearly all been drained; amongst them is the formerly flooded basin above the Holyoke defile. But the course of the river is still interrupted at intervals by falls and rapids with their fringe of manufacturing towns. A similar *régime* is presented by the Housatonic, another river which falls into Long Island Sound west of the Connecticut.*

* Chief rivers of New England according to Gannett in the Reports of the Eleventh Census:—

	Length.	Catchment Basin.	Mean Discharge. Cubic Feet.
Penobscot	294 miles.	8,934 sq. miles.	10,000 per second.
Kennebec	220 „	10,102 „	11,000 „ „
Androscoggin	196 „		
Saco	92 „	1,400 „	1,950 „ „
Merrimac	170 „	4,864 „	5,500 „ „
Connecticut	400 „	11,269 „	10,750 „ „
Housatonic	154 „	1,933 „	1,800 „ „

The Hudson Basin—Lakes George and Champlain.

The Hudson, which flows parallel with the Connecticut, is, from the geological standpoint, rather the remains of a marine channel than a river. Formerly it formed a continuous sheet of water with Lakes George and Champlain, being connected through these magnificent basins with the St. Lawrence estuary. The depression traversed by the Hudson, flanked on one side by the Green Mountains, on the other by the Adirondacks, is itself one of those central Appalachian valleys, such as the long troughs through which flow the Shenandoah and the New River. Lake Champlain, however, instead of being disposed north-east and south-west, like the Appalachian system generally, opens southwards and communicates with the sea by a lateral breach. Like so many other features in the crust of the globe, the continuous depression occupied by the beds of Lake Champlain and the Hudson River owes its origin to a multiplicity of causes. This depression has been named by Guyot the Great Appalachian Valley. The low divide in it between Lake Champlain and the Hudson is now crossed by an artificial canal connecting these waters.

Lake George, the ancient Horicon, or "Silver Water," occupies a small lateral depression, parallel with the southern extremity of Champlain, and sending its overflow to this basin through the Ticonderoga, or "Roaring Water," which tumbles into the lake over a terraced cascade some 34 feet high. Near this spot the French had erected Fort Carillon (the "Chimes"), so named from the music of the romantic waterfall. Carillon was the most important stronghold in this district so long contested by the French and English.

Lake George is one of the marvels of North-east America. Half river, half lake, it winds between mountains and hills, unfolding an endless variety of lovely vistas in its verdant shores, bold headlands, and its low or rocky islets, some bare, some wooded or carpeted with grassy meads. Its pellucid waters have a depth of 400 feet in its deepest cavity, and to their crystalline transparency the basin is said to owe its French name of Saint Sacrement (Lake Sacrament), the water having served to replenish the fonts in the churches on the banks of the St. Lawrence.

Lake Champlain, greatly elongated, like Lake George, like it also meanders through its narrow basin, now broadening out into circular expanses, now contracting between rocky points and bluffs, and thus presenting on a larger scale picturesque views analogous to those of the Silver Water. About four times longer, it has also a far greater mean width, while its extreme depth is about the same, 400 feet. Discovered in 1609 by Samuel Champlain, its northern extremity still forms part of Canada, and its outlet, the Sorel, belongs entirely to the province of Quebec.

The highest source of the Hudson flows from the foot of Mount Marcy, in the heart of the Adirondacks, 4,327 feet above sea-level, and the lakelet where it has its rise has received the poetic name of *Tear of the Clouds*. The torrent rushes over a series of cataracts, its current sweeping down blue, green, and gold, or opaline fragments of labradorites. Hundreds of lakelets send their waters to

the main stream, which soon takes the aspect of a river rolling down a considerable volume. Blocks of black marble obstruct its course at Glen's Falls, where it plunges in a superb sheet 80 feet high down to a deep gorge whose wooded crags have already been occupied by human habitations. Beyond this point follows a succession of rapids, after which the Hudson continues to fall through fresh cascades from terrace to terrace down to its confluence with the Mohawk.

This spot, about midway between its source and mouth, or 150 miles from both, is one of the vital points in the geography of the American Continent. The two valleys which here meet at right angles, one disposed in the direction of the Great Lakes, the other turned towards the St. Lawrence, are two historical highways of such a marked character that the converging point could not fail at all times to possess great strategic value, even when the country was inhabited only by savages. Here the English and French, and later the American forces and the royal troops, frequently crossed swords, and when the wars were succeeded by the era of peace, the cross roads of the main branches of the Hudson continued to maintain their importance by securing the commercial supremacy of New York.

The Mohawk, which joins the Hudson at right angles, and imparts to it its fluvial character, has its source to the east of the lacustrine region formerly constituting the domain of the Six Nations. It flows at first through a gently undulating plain between meadows and clumps of trees to its junction with Canada Creek (*Kanahta*, or "Amber Water"), by which its volume is doubled. This stream, which descends from the north, is famous throughout America for its romantic cataracts, known as Trenton Falls, where the current plunges over five grand cascades and swirling rapids a total height of 200 feet down to a deep ravine clothed with verdure. The falls and the thousand prospects of the deep chasm present an endless diversity of scenery. The rocky sides of the gorge, formed of Silurian limestone, rise like walls of masonry disposed in horizontal layers, varying in thickness and rent by fissures. The bed of the ravine is as if paved with blue-black slabs, which have been polished by the flood waters, and here and there detached by the underwash. Trenton Falls is a classic spot for geologists, thanks to its wealth in fossils belonging to the dawn of life on the globe.

East of Canada Creek the Mohawk, where it skirts the base of the Adirondacks, is itself precipitated over a series of cascades, which are now utilised by the industrial town of Little Falls. Lower down it flows in a tranquil current between grassy banks as far as its last cataract, that of Cohoes, above the cluster of shattered islets where the Mohawk and the Hudson merge in a single channel. But the Cohoes Falls, 80 feet high and 1,000 wide, no longer exist, except during the floods; at other times the neighbouring factories use up all the water for their machinery, and after dividing it into a thousand canals return the polluted fluid through wooden or iron pipes to the river bed.

The united streams form the Hudson properly so called, a magnificent watercourse, which is often spoken of as the "American Rhine." The title is fully

WEST POINT AND THE HUDSON RIVER.

merited, less for the poetry of local legend and historic memories, although even these have already lent their charms to the landscape, than for the picturesque beauty and varied character of its scenery; in this respect the Hudson is almost unrivalled. In the bustle of its commercial life and its passenger traffic, it also equals, and even surpasses, the Rhine. Lines of railway skirt it on both sides, and its waters are everywhere alive with steamers, tugs, well freighted sailing vessels, yachts, and other pleasure boats; as many as fifty barges are sometimes seen following in the wake of a single tug.

The tides, although not reaching as far as the Mohawk confluence, make themselves felt to within a short distance of this point, at least by stemming the fluvial current and diminishing its velocity. Formerly when the means of transport were less developed than at present, sea-going vessels ascended the river with the tide right up to Hudson, 114 miles from the sea. Every winter the surface above the tidal reaches is completely frozen over, and one of the chief local industries is the housing and sale of the ice. Sledges constructed for the purpose and rigged with sails glide with surprising velocity over the frozen surface.

The Hudson winds round the Catskill headlands without developing any rapids. At the point where it pierces the chain of highlands it still maintains an unruffled surface; but above the obstruction it expands into a veritable lake, and then the contracted current flows to right and left, through a series of abrupt windings. The spot marks the site of the rocky barrier which formerly dammed up the Hudson waters, deflecting them through Lake Champlain northwards to the St. Lawrence. Immediately above and below these eroded ramparts the stream has a mean width of about 1,100 yards, but in its passage through the highlands it is contracted to half that width. In other respects the Hudson still resembles the Canadian watercourses, in its transitional state between a chain of lakes and rapids and a fully developed river. In the irregularity of its shores carved into creeks and inlets, it has retained somewhat the aspect of a fjord, and in many places the banks have not yet been completely formed. The more regular contour lines acquired by the river are of an artificial character, being due to lateral railway embankments.

The spacious Tappan Sea, as it is called, which is developed below the highlands, is in reality an elongated lake, disposed in several secondary basins by bold rocky headlands. Lower down, after resuming its fluvial aspect, the Hudson washes the base of the Palisades, a long line of trap cliffs, so called either from some old fortified works of the Dutch settlers, or from their peculiar columnal formation. These cliffs, which rise from 300 to 500 feet above the stream, extend for a distance of 14 or 15 miles along the New Jersey side, to a point several miles above New York city. The pillars are at intervals distinct enough to form veritable colonnades, though their height has been reduced to one-half by landslips now covered with herbage.

Below the Palisades the Hudson, here called the North River, because it lies north of the Delaware, formerly known as the South River, expands at once into New York Bay. One of its lateral channels diverges from the main stream east-

wards to the East River, another section of the harbour, beyond which it ramifies through Hell Gate towards Long Island Sound. Thus the Hudson becomes completely merged in the bays and straits of the estuary.*

The submarine prolongation of the Hudson valley, a phenomenon analogous to that so clearly observed at the "Gouf" of Cape Breton facing the old mouth of the Adour in the Bay of Biscay, extends beyond the estuary to the Atlantic.

The Delaware.

In their general aspect the Delaware and the other rivers piercing the Appalachians farther south present a marked contrast to the Connecticut and Hudson. These two watercourses descend due south between the groups of uplands, whereas the Delaware, disposed in the direction from north-west to south-east, flows seaward in a succession of abrupt windings through longitudinal valleys, and through transverse sections of the mountains. The farthest sources of the Delaware have their rise in the western glens of the Catskills, and flow first south-west across elevated hilly plains in the direction of the Susquehanna; but before reaching that river its course is deflected south-eastwards through a deep gorge in the plateau, and separates the States of New York and Pennsylvania. At the northern corner of New Jersey the river leaves its gorge and bends sharply to the south-west to follow the broad valley between the Pocono plateau and Kittatinny Mountain. Suddenly a narrow fissure appears in the rocky walls of Kittatinny between the magnificent Tammany cliffs on the north and the more gently sloping Minsi on the south; here the Delaware plunges into a rocky gorge about two miles long between precipices from 1,000 to 1,300 feet high, beyond which it again bends round at a sharp angle. This gorge, most famous of all the water gaps, has become one of the most frequented summer resorts.

The Lehigh, chief affluent of the river, and known also as the west fork of the Delaware, presents on a smaller scale all the salient features of the main stream. Like it its course winds in abrupt bends, and pierces the Kittatinny hills through the Lehigh Gap, beyond which, impinging on the opposite heights, it is deflected north-east to its junction with the Delaware at Easton. Then the united stream, penetrating through another series of gaps, pierces the broad low swell of South Mountain. Near Trenton some rapids are developed at the head of tide water, below which the river bends round to the south-west, here traversing the low-lying coastlands over a course which was at one time perhaps a marine beach, forming a continuation of the Long Island Sound coast between New York and New Haven.

In this part of its course the Delaware is joined just below Philadelphia by the Schuylkill, that is, the "hidden river," so named by the early Dutch navigators because its mouth is marked by a cluster of islets. Farther down the Delaware gradually expands in an estuary sweeping in a long bend round to the bay, which resumes the normal south-easterly direction. The main stream is

* Approximate length of the Hudson . . . . . 310 miles.
Area of the catchment basin . . . . . 13,366 square miles.
Mean discharge . . . . . 15,000 cubic feet per second.

accessible to sea-going vessels as far as Philadelphia, and to steamers of light draught as far as Trenton.*

The Susquehanna.

This is a longer river, and drains a larger area than the Delaware, rising farther north and reaching the sea farther south, and taking a wider sweep westwards, though roughly parallel in its various meanderings with that watercourse. Nevertheless it is of less economic value, both because it lies farther from New York and Philadelphia, the great commercial centres of the north-east, and also because it does not fall directly into the sea nor into an estuary facing the great lines of marine navigation. It debouches at the head of the narrow and sinuous Chesapeake Bay, which stretches thence southwards for over 175 miles, thus diverging from the main Atlantic trade routes. It is also less navigable, as indicated by its Lenape name, which is said to mean "broad and flat." In fact, throughout nearly the whole of its middle and lower course it spreads out in a bed over 1,000 yards wide, fordable at intervals, studded with rocks and obstructed by aquatic vegetation, which scarcely affords passage to rafts and light craft; hence it has been found necessary to canalise its banks.

Rising in the Catskills and the heights skirting the Mohawk, the Susquehanna flows first south-westwards, receiving the Chenango from the north and the Chemung from the north-west; then it bends abruptly round to the south-east, and cuts a deep gorge through the heart of the Appalachian plateau. It emerges in the beautiful canoe-shaped Wyoming Valley, which it traverses in a south-westerly direction, passing Wilkes-Barre, the centre of the northern anthracite basin. Near the south-western extremity of the valley the river pierces the mountain wall to the right, and resumes a south-westerly direction as far as its junction with the western fork of the Susquehanna. This branch on its part rises far back on the plateau in northern Pennsylvania, which it traverses in a steep and narrow defile in a general south-easterly course. At Lock Haven it enters the zone of parallel ridges and valleys, and is deflected to the north-east by Bald Eagle Mountain, along the base of which it flows to the termination of the range beyond Williamsport, where it bends abruptly to the south, and after piercing several mountain ranges in a series of water gaps, joins the east fork.

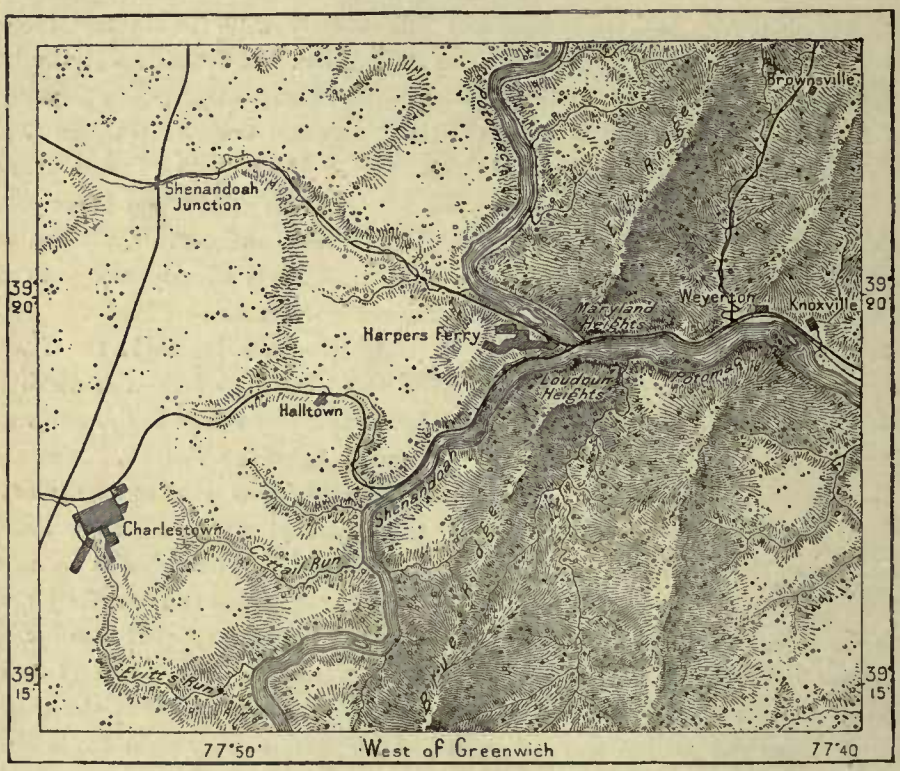
After the confluence of the two forks the main stream is joined by the Juniata, the "fair and blue," whose charming scenery has been described by many writers. Like the other branches of the Susquehanna, the Juniata forces the ramparts of the Alleghanies through a succession of romantic gorges. Having a shorter course than the two upper forks of the Susquehanna, the Juniata pierces the several parallel ranges in a much more narrow space, and consequently offers a greater wealth of striking contrasts.

On the lowland plains the Susquehanna, broad as a marine inlet, flows directly towards the northern extremity of Chesapeake Bay, of which it, so to say, forms a

* Total length of the Delaware . . . . . 310 miles.
Area of its basin . . . . . 12,012 square miles.
Mean discharge . . . . . 13,000 cubic feet per second.

landward continuation. Formerly the railway connecting Philadelphia with Washington was interrupted by the wide fluvial bed, and steam ferries had to transport the trains from one bank to the other. Now the channel, half river half marine inlet, is bridged by two parallel viaducts, whence the traveller surveys the broad waters with their low wooded shores. The rocky walls of the Susquehanna present the whole series of geological formations of the Appalachian

Fig. 28.—Harper's Ferry Gorge
Scale 1 : 180.000.



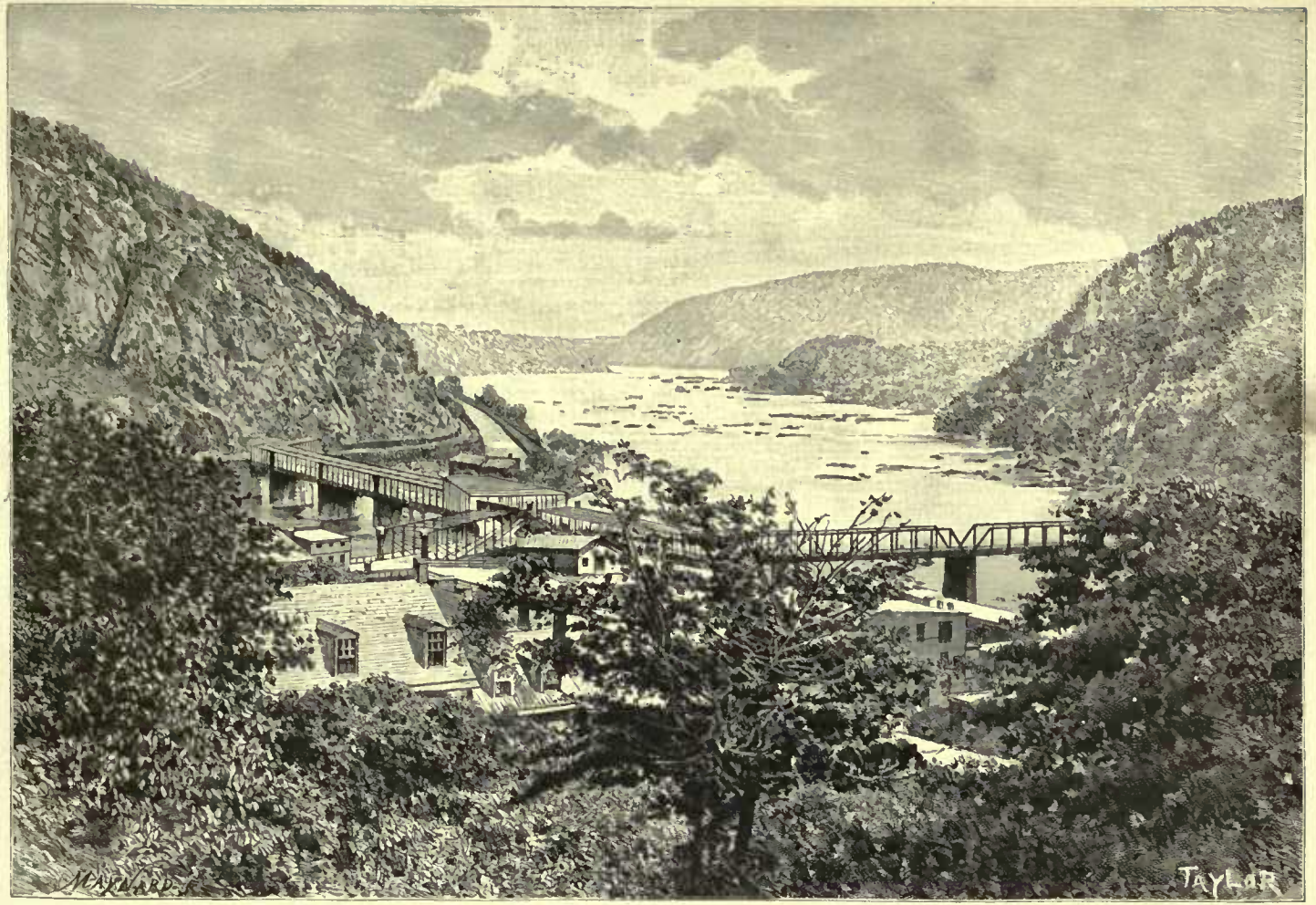
system, from the carboniferous strata of the west and the Silurian rocks of the central axis to the granites of the eastern ridges.*

The Potomac.

Like the Susquehanna, the Potomac falls into the almost closed basin of Chesapeake Bay, which presents the aspect of a great inland sea. The Potomac also rises in the Alleghanies at the eastern base of the plateau, and escapes towards the Atlantic through narrow gorges successively piercing the several ridges.

Above its last gorge the Potomac is joined from the south by the Shenandoah, another considerable river, which waters the northern portion of the valley of Virginia. Above the bluff at Harper's Ferry, which separates the Potomac from

* Total length of the Susquehanna . . . . . 400 miles.
Area of its basin . . . . . 27,655 sq. miles.
Mean discharge . . . . . 28,000 cubic feet per second.



HARPERS FERRY.

the Shenandoah, the ledges of eroded rocks are exposed in both beds during low water.* But at this point there are no falls, though other rapids occur farther down, the last being at the head of tide water, a little above Washington and the long fluvial estuary.

The James and other Southern Rivers flowing to the Atlantic.

All the other watercourses converging on Chesapeake Bay, the Rappahannock, Mattapony, Pamunkey or York, and the James, with its tributary, the Appomatox, also terminate their fluvial course, properly so called, with cascades or rapids at the point where the granitic formations are conterminous with the tertiary plains of the seaboard, and they all reach the sea through broad, winding tidal estuaries. Of these rivers the James alone rises in the heart of the mountains beyond the Blue Ridge; its affluents also have their source in parallel valleys, and join it by sharp bends at its passage through the gorges. Cedar Creek, one of the smallest of these affluents, passes under the famous Natural Bridge of Virginia, probably the largest of its kind in the world, rising over 200 feet above the torrent, with a span of about 80 feet. In the elevated valley, where rise the farthest headwaters of the James, the Appalachian system seems interrupted; the James basin belonging to the Atlantic slope is here separated by a scarcely perceptible sill from that of the New River, which flows through the Kanawha and Ohio to the Mississippi.

All the streams descending from the Appalachians and their southern prolongations into the Carolinas and Georgia resemble each other in the direction of their course and general fluvial character. The Roanoke, Cape Fear River, Great Pedee, Santee, Savannah, Altamaha, and the minor watercourses of the same slope, flow normally seawards, that is to say, in the direction from north-west to south-east according to the general incline of the land. All have pure water and fine cascades in their upper course, all wind sluggishly through the level coastlands, and are here lined with swamps, divided into secondary channels, or also obstructed at their mouth by low archipelagoes and strips of sand.

Among the numerous cataracts of these rivers, the grandest are those of Tallulah, in Cherokee the "Formidable," which form three successive falls interrupting the course of an affluent of the Savannah at the issue of a mountain gorge.

At the south-east angle of the Appalachian system the running waters descending from the upland valleys radiate like the ribs of a fan towards the south-east, the south and the south-west, the first in the direction of the Atlantic, all the others to the basin of the Gulf of Mexico. The rivers of Florida, which flow in the angular space between both coasts, have a different *régime*, and, apart from a few small streams, should rather be regarded as channels of oceanic origin.

The Atlantic Seaboard—Glaciation—Cape Cod.

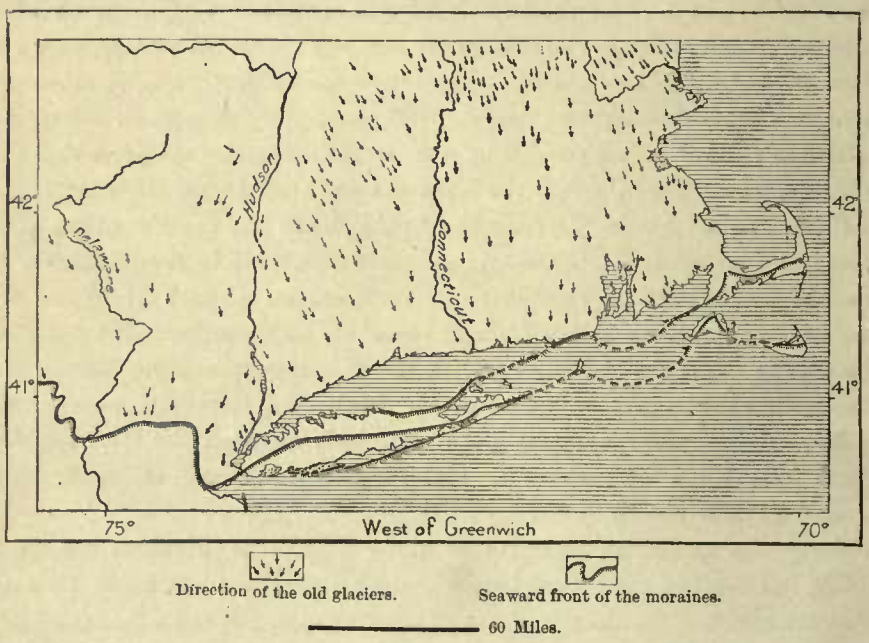
The shores of the Atlantic present a certain correspondence with the river basins, which send down to the coast the excess of their rainfall and the sedimen-

* Total length of the Potomac . . . . . 300 miles.
Area of its basin . . . . . 14 479 sq. miles.
Mean discharge . . . . . 10,500 cubic feet per second.

tary matter washed from the uplands. Still obstructed at a recent geological epoch by the glaciers radiating from the Canadian highlands, the estuaries through which the rivers of Maine reach the sea have preserved their primitive structure, their cliffs, rocky headlands, granite islands and archipelagoes striated by the ice streams. These crystalline masses, which filled the straits and sounds connecting the coast islands with the mainland, served to maintain the original form of the coast-line, which was again revealed when they melted away. Since then this coast-line has been little modified by the shingle, the sandy beaches or muddy beds deposited during contemporary ages.

But a little distance inland the pre-glacial relief of the ground has been greatly modified by the serpentine crests of the *kames*, or long irregularly stratified ridges of clay, sands and gravels deposited by the glaciers in the direction

Fig. 29.—South Front of the Old New England Glaciers.
Scale 1 : 4,500,000.



of their movement, and again disturbed or redisturbed by the running waters. These sinuous banks or ramparts, rising as much as 60 or 70 feet above the surrounding plains, have been formed in the same way as the *eskers* (*escars*) of Ireland and the *ösar* of Scandinavia, and like them are in many places merged in the lateral or frontal moraines.

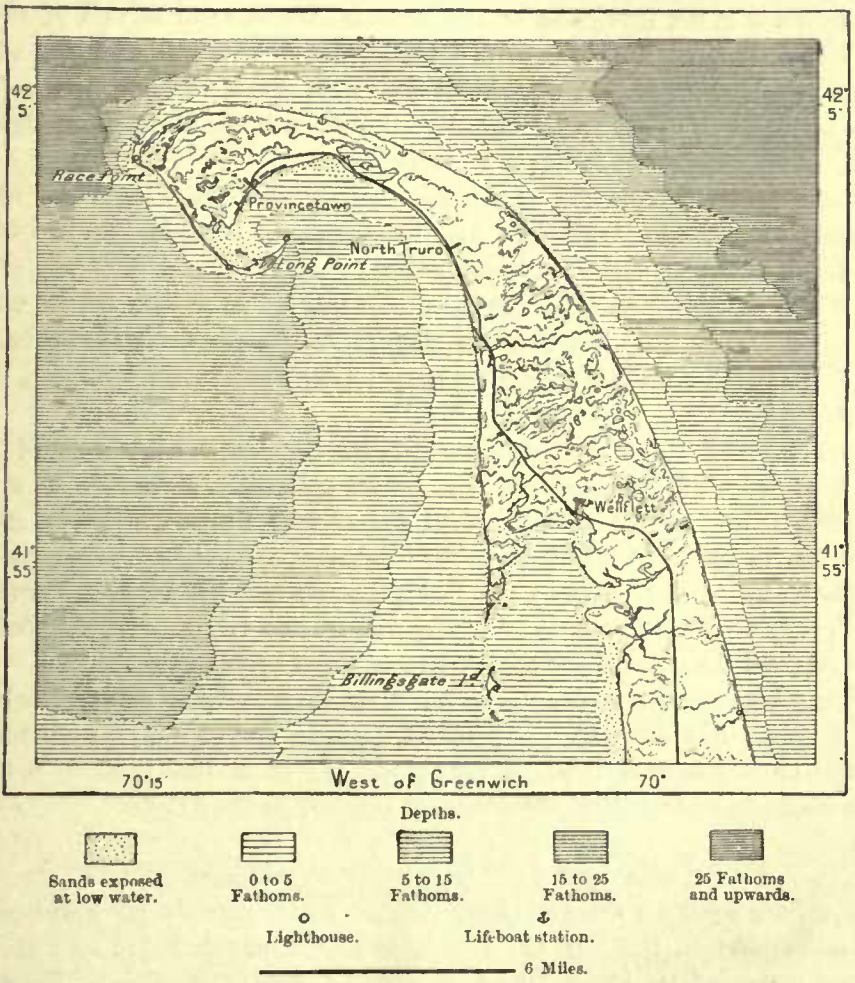
Other deposits left by the glaciers as they gradually retreated have in New England received the name of *drumlins;* they are slightly elevated but steep hills, which uniformly affect the lenticular (doubly-convex) shape, and which follow each other in parallel lines, developing their long axis in the direction formerly taken by the ice streams. All the verdant hills rising to the south of Boston are so many drumlins or knolls of glacial origin.

Lastly, innumerable little lakes or tarns, known in the north-eastern states as

Kettle-holes, mark the line followed by the glaciers. These depressions, some still flooded, others dried up or filled with peat, probably owe their existence to ice-sheets covered with moraines.

South of the rocky coast of Maine the low-lying shores of New England appear to have undergone considerable change from the action of ice. The islands lying beyond Cape Cod were certainly situated in front of the ice-cap, and according to Wright the great frontal moraine extended from the western

Fig. 30.—"Prow" of Cape Cod.
Scale 1 : 200,000.



extremity of Long Island all the way to Nantucket Island. When this outer moraine was abandoned by the retreating ice, another parallel with it was developed, stretching from the south side of Long Island as far as the peninsula of Cape Cod. A rocky bed serving as a submarine support indicated the direction taken by the frontal moraines. The drift left by them was afterwards attacked by the oceanic currents during the period of general subsidence of the land, and the form of these masses of still unconsolidated refuse was again modified by the

conflicting waves, which, amid the endless diversity of their movements, nevertheless follow a certain general rhythm.

Amongst all the peninsular annexes to the north-east coast none present more remarkable contour lines than Cape Cod, the Nauset of the extinct aborigines. Projecting at a right angle with the mainland, then bending round to the north-west, like the prow of a gondola, it encloses within its low-lying strand an inlet 25 miles broad between the opposite shores.

In its general outline it presents exactly the appearance of a marine eddy that had been suddenly solidified; nor can there be any doubt that it really owes its shape to the movement of the currents, which meet at this point and turn upon themselves in long regular curves. The lakelets still persisting within the curvatures of the littoral cordons are old sheets of salt water, which have been gradually enclosed by the accumulating sands, and which have been slowly changed to freshwater ponds by the rains and running waters.

The conspicuous projection of the peninsula beyond the normal line of the mainland, its eccentric form and its dangerous approach, combined to make Cape Cod the most striking feature of these waters in the eyes of the early navigators. Hence many writers have with Rafn identified this headland with the Kjalarnœs (Keel-ness, Prow-head), on which the Norwegian navigator, Thorwald, landed, the point of land being so named from its resemblance to the prow of a Scandinavian vessel.

The island of Martha's Vineyard, which, till the year 1650, was called Martin's Vineyard, from the Christian name of its discoverer, Martin Pring, would, according to the same historians, recall the ancient Vinland, as if in contradistinction to the great Wineland, as the neighbouring coast had been named by the Norse pioneers. Like the Cape Cod peninsula and the adjacent Nantucket Island, it is a moraine at once of glacial and marine origin. The denuded uplands supplied the materials, which were re-arranged by the waves.

Nantucket especially shows the action of the currents by its shape. Its south side, disposed in a line with Long Island, indicates the edge of the continental pedestal on which New England rests; but the shore line turns at a sharp angle from south to north, in the direction followed by Cape Cod.

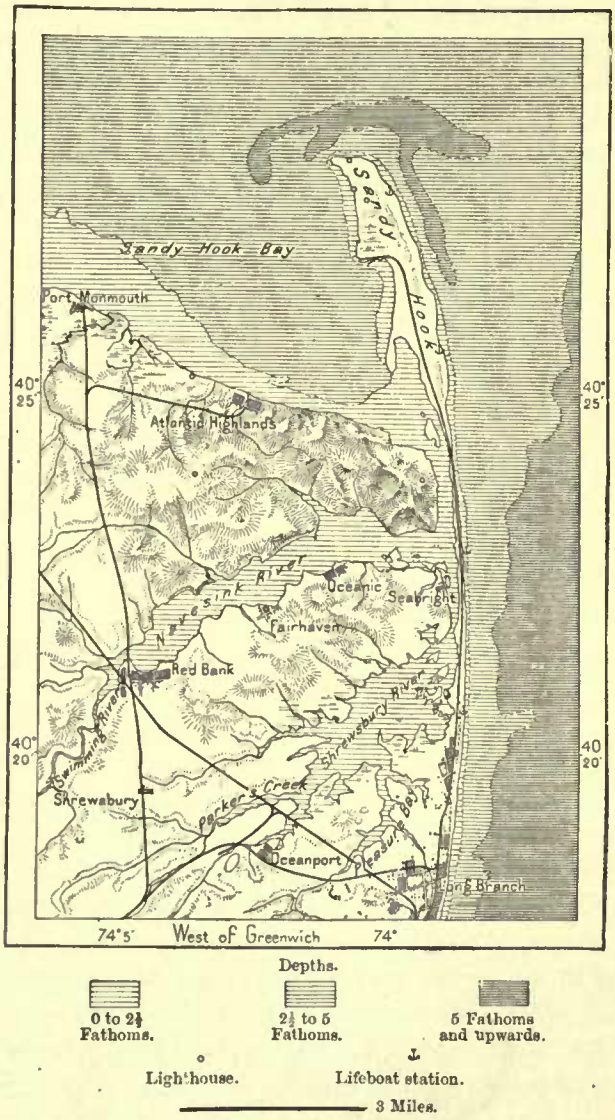
New York, New Jersey, and Delaware Coastlands.

The long southern shore of Long Island, which extends for a distance of 120 miles between the Bay of New York and Montauk Point, and is even further prolonged by Block Island, is entirely of marine origin. From one extremity to the other the outer strip of sands, affecting the form of the string of a fiddle-stick, masks the irregularity of the inner coastline, which is carved into creeks and inlets at the foot of the hills dating from the secondary epoch, which constitute the backbone of the island.

South of New York Bay a peninsular region of massive outline is clearly defined by the sea-shore and the course of the Delaware below Trenton. Although the neck of this peninsula is not composed of recent alluvia, and

although it presents stratified rocks deposited during secondary times, it has but a slight elevation above sea-level; the watershed between South Amboy and Trenton is scarcely perceptible. On the seaward side the peninsula, which comprises South New Jersey, presents a stretch of sands of the same formation as those of Long Island, and almost exactly of the same length.

Fig. 31.—Sandy Hook.
Scale 1 : 200,000.



Thus the great port of entry of America, that is to say, New York Bay, is approached from the Atlantic side through a vestibule of singularly symmetrical form; only the New Jersey spit, more sinuous than that of New York, and more indented by inlets, enables the flooded depressions of the interior to communicate with the sea. The northern extremity of the strip of sands is the far-famed Sandy Hook, which projects six miles seaward, and on which stand a lifeboat station, defensive works, a semaphore, and a lighthouse.

South of Sandy Hook the coastline is fringed at first by no sandbanks; but farther on the cordon again develops itself at some distance from the true continental shore-line, enclosing extensive sheets of salt water and debatable marshy tracts, forming part of the land during protracted droughts and part of the sea during the rains.

Great changes have taken place in the level of the land, as is attested by the submerged forests, especially in the neighbourhood of Cape May, southern headland of the peninsula commanding the entrance to Delaware Bay. Here are found extensive morasses filled with a thick mud, in which large trees of the white cypress (*Cupressus thyoides*) are buried to a depth of over 10 feet.

These buried forests seem to indicate a subsidence of the land, while on the other hand oyster banks standing several feet above sea-level show that movements in the opposite direction have also taken place.

The peninsula between Delaware and Chesapeake Bays resembles that of New Jersey; only it is of less massive form, and more elongated, while its tapering serrated extremity develops a more graceful curve southwards. The seaward coasts of both are disposed in the same direction, parallel with the Appalachians, and along the brink of the depression over which flows the Gulf Stream.

The peninsula separated by Chesapeake Bay from the rest of the mainland has a total length of 170 miles, with a breadth of over 60 miles in the central part. But it narrows greatly towards the neck, so that at this point there is a distance of only ten miles from estuary to estuary, while the intervening tract is very low. Thus it was found easy to connect Delaware and Susquehanna basins, between Philadelphia and Baltimore, by a canal ten feet deep.

Chesapeake Bay.

Chesapeake Bay has no rival amongst the inland seas of the United States. It is the port of entry for all the central parts of the Appalachians, the common outlet of numerous river basins, such as the Susquehanna, Potomac, Rappahannock and James, the outer harbour of Baltimore and Washington, of Richmond and Norfolk. Over New York Bay it has the immense advantage that it is accessible to vessels of the heaviest draught, even at low water, although its mean depth scarcely exceeds 30 feet; even the central channel is in many places not more than 50 feet deep. The tides from the high sea penetrate into all the converging estuaries, and the hydrographic system is, in appearance, the same as in the Atlantic waters. But the short chopping waves, unexposed to the full fury of the ocean gales, are powerless to modify the outlines of the surrounding shores, as those on the seaward side of the peninsula are modified by the Atlantic billows. The sandy cordon fringing the outer coast-line corresponds to no similar formation round the margin of the bay. Here the beach is deeply indented by creeks and inlets, which have themselves numerous secondary ramifications, all alike destitute of straight or slightly curved fringing sands. These inlets may be obstructed by mudbanks and islets; but the approaches are quite free from the cordons of sand elsewhere indicated by long lines of surf endangering the entrance.

Thus the estuaries preserve the thousand indentations of their shores, and the mud brought by the currents and mingled with the countless organisms swarming in the water are the chief geological agencies in modifying their outline.

The Southern Coastlands—The Dismal Swamp.

At a former geological epoch the inland sea, of which Chesapeake Bay formed part, extended southwards beyond the James River estuary. Here it is still represented by extensive marshy tracts, the largest of which has been aptly named the Dismal Swamp. This truly depressing region presents a frightful appearance, with its great pines, junipers, bald cypresses, and black gums, whose

gloomy shade falls heavily on the surrounding black lands, and its avenues of stagnant waters reflecting a glimmer of the dull light diffused amid muddy islets and masses of decaying vegetation. The whole scene vividly recalls Moore's lines:—

"Away to the Dismal Swamp he speeds,
His path was rugged and sore,
Through tangled juniper, beds of reeds,
Through many a fen, where the serpent feeds,
And man never trod before!"

The Great or Dismal Swamp, properly so called, covering a space of some 600 square miles about the Virginian and North Carolina frontiers, stands at the base of an old coast terrace, and about 20 feet below the western plains, whence it receives numerous sluggish rivulets, whose waters are absorbed in the peaty soil. Swollen by these waters, which filter through its spongy mass, the swamp rises gradually towards the centre, and its height above the margin is estimated at from 10 to 12 or 14 feet. In this central and more elevated part are collected the waters, which here form a blackish lake some 14 feet deep. On the southern, western, and northern margins the waters ooze through the tangle of marshy vegetation into narrow winding channels. The Dismal Swamp marks the southern limit of the bog masses (*Sphagnei*), which are found to a greater or less extent in the marshes farther north. Here is the northernmost considerable development of the common cane (*Arundo*), which, with the wild grape and the green briar (*Smilax*) and, in certain sections, the very peculiar mangrove and the dwarfed palmetto, form the characteristic swamp vegetation throughout the south.

South of Cape Henry the North Carolina seaboard presents to the Atlantic surf an almost unbroken line of sands, which is distinguished from similar banks elsewhere by its enormous length, and by its three sharp points, Capes Hatteras, Lookout and Fear, projecting like spearheads seawards. These three headlands, fringed by much-dreaded submarine sandbanks, indicate the points where whirlpools are formed by the conflicting currents. The shore-line itself has been determined by the action of the waters, which have given it that decidedly easterly trend, differing in direction from the other physical features of the country, the Appalachian ranges and the marine escarpment of the continental pedestal. Here the sandbanks have enclosed two considerable marine gulfs, Albemarle and Pamlico Sounds, nearly as large as Chesapeake Bay. But these inland seas are almost abandoned by shipping, to which they are scarcely accessible. They communicate with the Atlantic only through low and shifting "inlets," or channels, obstructed by islets and mudbanks; these basins are also surrounded by marshy or sandy plains, destitute of any large centres of population.

Along South Carolina the coast-line is disposed in arcs of a circle, resembling the gracefully curved cordons which are limited by the three capes of North Carolina. But in the southern state these arcs are already attached to the mainland, or at least enclose inlets which are but of small extent, and which are transformed by numerous islets into a labyrinth of channels and backwaters. Such is, south of Charleston, the group of the Hunting or Port Royal Islands,

which, in the commercial world are noted for the excellence of the "Sea Island" or long staple cotton grown in this district.

The Peninsula of Florida.—Coralline Formations.

South of this point the coast-line changes its direction, developing a long gentle curve to the south. Here terminates the section of the seaboard which

Fig. 32.—North Carolina Sandbanks.
Scale 1 : 1,800,000.

belongs geologically to the North American mainland. The parallelism between the shore-line and the main axis of the Appalachian system entirely ceases, and in its general trend, as well as in the character of its rocks, climate, and natural productions, Florida, like the neighbouring Bahamas, is a detached fragment of the West Indian world, connected physically with the United States only by the

upheaval of the land at its neck. Here a band of tertiary formation, penetrating some distance into the peninsula, forms the connecting link. The mean altitude of Florida is scarcely 100 feet, and the railway running from Cedar Keys to Fernandina traverses the watershed of the connecting zone at an elevation of 210 feet.

The peninsula of Florida, which presents a more elongated form than that of the Mexican Yucatan, is of analogous origin in its southern section; here the recent action of the sea is even more evident. Consisting of calcareous rocks of coralline origin and of sands deposited by the waters with triturated shells, the land has been gradually formed since pliocene times, and its genesis may be followed in the general trend of its rocky heights and the direction of its rivers.

In this respect the depression occupied by the Saint John river offers an instructive study. The valley is developed parallel to the Atlantic coast with such a slight incline that the watercourse, or rather the string of lakes and gullets following from south to north, has a fall of only nine feet in a total distance of 250 miles. Evidently this inland channel was formerly a marine strait separating a fringing coralline reef from the mainland. The strait silted up in the south, and the consequence was that the fresh water discharged by the clouds and springs into the channel replaced the salt water, and while seeking a seaward outlet gradually transformed the strait to a river.

Here we have a phenomenon analogous to that which gave rise to the *rio* or inner channel which skirts the north coast of Yucatan; only the two waterways differ in their respective degrees of geological evolution. Should nothing come to interfere with the process now going on, the new shore-line which is being developed in front of the Yucatan mainland will, in its turn, become soldered together in a continuous rampart; then becoming closed at one of its extremities, it will compel the marine channel to change, like that of the Saint John, to a fluvial watercourse, already, as if by anticipation, locally called a *rio* (river).

In the southern part of Florida, which at Cape Sable projects like a fishing-hook, the coral reefs successively built up around the peninsula have retained in the interior numerous swamps, lagoons, and lakes of considerable extent, but incessantly shifting their margins with the seasons and years, according to the abundance of the rainfall and continuance of the droughts. Okeechobee, largest of these lakes, has a mean estimated area of 1,200 square miles, and is continued southwards by a labyrinth of shallows known as the Everglades.

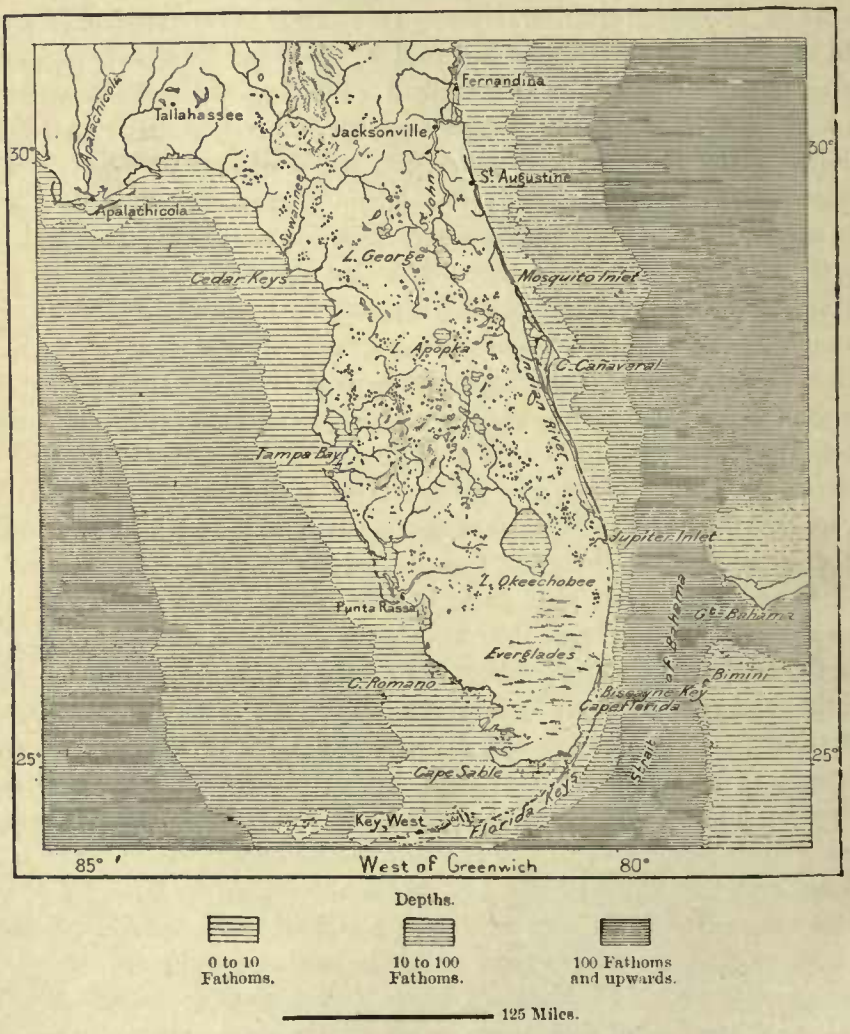
This watery domain is large enough to completely interrupt the communications between the two sections of the peninsula bordering eastwards on the ocean, westwards on the Gulf of Mexico. Dense forests flourish on the dry rising ground amid the flooded depressions, while all the creeks are overgrown with sedge. The shallowness of the lakes and streams renders them unnavigable except for skiffs, and even in the vicinity of the few groups of habitations scarcely any fishing boats are seen. The deepest cavities of Lake Okeechobee have at most 13 or 14 feet; hence in stormy weather the waters are disturbed down to their muddy bed. Thus is explained the scarcity of fish, and the absence even of crustaceans, the agitated waters preventing the spawn and fry from coming to

maturity. Alligators, however, infest the channels, sheltered from the wind by the reeds and other aquatic plants.

Towards Key Biscayne a few coral reefs forming the outer barrier rise more than 24 feet above sea-level, which seems to indicate a general upheaval of the coast. The margin thus formed prevents the normal flow of the rain water, and in this way have been created the lakes and swamps of the interior. In several

Fig. 33.—Peninsula of Florida.

Scale 1 : 7,000,000.



places the fissures and caverns of the calcareous rocks have enabled the pent-up waters to escape, and seafarers are acquainted with some copious springs of fresh water which well up from the bed of the sea along the Florida coasts. Occasionally, after heavy rains, the turbid yellowish water of these springs discolours the sea for a great distance, and is very destructive to the marine fauna. One of these wells, four miles south of Saint Augustine, and within a mile of the shore,

spreads its warm waters over a space nearly 22,000 square feet in extent; ordinary soundings have failed to reach the bottom of this spring.

In the interior of the peninsula the lacustrine waters stand some yards above sea-level; hence it would be easy to drain them to Bahama Channel, and this work has already been partly accomplished by an agricultural and canal company.

At present the coral builders are not at work round the whole periphery of the Floridian peninsula. Till recently it was supposed that the polypi began their operations towards Key Biscayne at the south-east corner of the peninsula; but the geologist, Shaler, has discovered recent coralline structures much farther north, as far as and beyond Jupiter inlet. At any rate one species was still flourishing within a recent period as far north as Cape Cañaveral, and even under the latitude of Mosquito Inlet, below the neck of the peninsula.

In the Everglades may be distinctly recognised the ranges of coralline *hummocks* which were successively formed in the yeasty marine waters, and which were afterwards cut off from the sea by fresh reefs rising above the surface. The long line of keys (*cayes*), which begins near Cape Florida and developes a vast curve to and beyond the meridian of Havana for a total length of about 225 and a mean width of 15 miles, is an aggregate of coral structures which had the same origin as those of the Everglades, and which will one day continue that geological system seawards.

All these keys are very low islets, with an average height of eight or ten feet above sea-level; even the highest, such as those of Key West, are not more than 18 or 20 feet high, and all alike, however elevated, become partly submerged during the boisterous weather. The Florida, Tortugas, Marquesas, and all the keys, have their more precipitous sides turned towards the Gulf Stream, while they are continued northwards, that is, away from the tepid waters, by shallows which become gradually covered with sedimentary deposits. Here and there the soil is already deep enough to enable the mangroves to take root. Long before a new islet rises flush with the surface, these plants, mounted on their framework of aërial roots, expand like green hangings, or become grouped in continuous forests. Seaweeds, driftwood, flotsam of all kinds accumulate amid the tangle of roots and stems, and thus the island gradually shows its muddy surface or sandy inlets above the green mangrove bushes. Sometimes the vegetation is absent, and then the presence of the hidden reefs is revealed by a sandy mound rising solitary amid the marine waters.*

Farther seawards, to the south and west of the upheaved chains of keys, other more recent coral islets still in process of formation are here and there indicated by reefs already rising above the surface. This advanced barrier of submarine rocks constitutes a great danger to navigation, and here thousands of vessels have already been wrecked. On the other hand hydrographic exploration has shown that numerous channels, deep enough for the largest ships, interrupt the belt of reefs, and that the still submerged coralline masses are separated from the visible keys by a long basin of smooth water, with an average depth of from 16 to over 30

* L. Agassiz, *American Association*, Cincinnati, 1852.

feet. If well explored and carefully buoyed, this passage might become an easy means of communication between Cape Florida and Key West.

Thus barrier succeeds barrier in the construction of the Floridian edifice. But it might be asked why the keys have been upraised in such a way as to give this peninsular form to the new lands? The gradual enlargement of the peninsula in the direction from the north to south is explained by the first nucleus of rocks around which were grouped the colonies of coral-builders. But in this operation account must also be taken of the action of the Gulf Stream, which sweeping by the shores of Cuba discharges westwards, that is to the Florida waters, the sedimentary matter which it carries along. All this refuse deposited by the current in smooth water serves to build up the pedestal of the peninsula.

The Gulf Stream.

At its exit from Florida Passage the Gulf Stream has a volume of tepid water which was most diversely estimated by the first hydrographers who studied its general features. But if it cannot be measured, the quantity may at least be somewhat more accurately determined, for the depth and other dimensions of the Strait are well known, while the velocity of its current has been frequently studied at all hours of the ebb and flow, and at all seasons of the year. The liquid mass discharged by the Gulf Stream into the Atlantic lies between the extremes of 28 and 86 cubic miles per annum, which is certainly a very small fraction of the waters setting north-eastwards, towards the coasts of West Europe. The Gulf Stream was formerly supposed to flow in a sort of valley parallel with the coast of Georgia and the Carolinas, and it was assumed that it ramified into parallel currents, separated from each other by belts of cold water corresponding to so many distinct submarine ridges. But the researches made by the United States Coast and Geodetic Survey have shown that these assumed inequalities have no existence, and that the bed of the Gulf Stream is formed by a plateau about 400 fathoms deep, slightly inclined towards the outer scarp, which suddenly plunges eastwards into abysses of 1,000 or 1,500 fathoms. Hence the stream is here still confined to the continental pedestal, and its force is evidently felt right to the bottom on this plateau, which it has thoroughly scoured of all mud and other refuse.

The temperatures recorded by the thermometer also show that the whole plateau is entirely occupied by the Gulf Stream, for here the warmth of the tepid waters decreases vertically exactly at the same rate as farther south between Florida and the Bahamas. It falls from about 83° F., the extreme at the surface, to 45° on the marine bed, whereas beyond Cape Hatteras, where the waters of the Polar current are met, the mercury at the same depth falls to 39° F.

From the general relief of the Floridian peninsula the geologist, Shaler, has inferred that within a comparatively recent epoch the current may have set in another direction. The southern coralline region, composed entirely of organic remains, was nearly quite level, the inequalities of the surface being measured by inches. On the other hand, the northern section of the peninsula as far as the parallel of St. Augustine is connected with the mainland by tertiary strata covered with sands, which have been distributed over the slopes by the northern currents.

But the central peninsular region presents quite a different aspect, the surface being broken by numerous sandy knolls and ridges in some places rising to a height of 300 feet, while the intervening depressions are studded with lakes, lagoons, ponds and morasses. Such flooded basins are reckoned by thousands.

The resemblance in the general appearance of the regions naturally suggests a correspondence in the geological phenomena; hence the inference that these Floridian hillocks were also deposited by the marine currents of which the flooded basins are all that now survives. Florida had not yet risen above the surface of the sea when these eminences were formed; an open passage still flowed between the Gulf of Mexico and the Atlantic, along the present neck of the peninsula, and the Gulf Stream, which is now confined to the narrow gateway of Bahama Passage, expanded through a broad strait eastwards. Thus the present mouth of the Saint John River would seem to indicate the old outlet of the marine waters.

III.—Climate, Flora, Fauna of the Appalachians and Atlantic Slope.

Along the seaboard the normal temperature decreases with tolerable regularity from north to south, and in this respect the greatest anomalies are found in the northern zone, between New York and the St. Lawrence, a region whose coast-lands are greatly diversified, carved into bays and inlets, and bristling with rocky headlands. On the uplands of the Appalachian system the climatic conditions naturally vary with the altitude; but, taken as a whole, these uplands have a scarcely appreciable influence on the climate of the plains lying at their base. At equal altitudes the daily and annual temperatures correspond on the eastern and western slopes; the rainfall is here also somewhat uniformly distributed.

The cause of this uniformity must be sought in the general trend of the orographic system, which is parallel with the normal set of the marine and atmospheric currents. The prevailing winds, as well as the Gulf Stream and the polar current, move in the directions from north-east to south-west, or from south-west to north-east. The parallel chains of the Alleghanies, being developed in an analogous direction, like the piers of a bridge in midstream, produce no disturbing effect on the general movement of the winds; a certain climatic equilibrium is established in the same way on the landward and seaward slopes.

In apparent contradiction to this broad statement, the greatest summer heats on the Atlantic seaboard of the United States are not always those which prevail in Florida, that is, in the extreme south. Exceptional temperatures are, on the contrary, all the more intense the farther we advance northwards, and here the sultry summer heats seem all the more oppressive that during the same season the daily range of the thermometer is greater. Thus in the islet of Key West, off the southern extremity of Florida, the temperature varies but slightly from winter to summer, from day to night, and from hour to hour, whereas it oscillates between extremes two or three times wider apart in Charleston, Philadelphia and Boston.

One of the causes that most contribute to intensify the summer heats throughout the Atlantic zone of the United States is the greater prevalence of southern and south-western winds during that season. In winter, also, the cold is often

greatly increased by the winds blowing from the north-west. Farmers often suffer from spring frosts caused by the same winds. Even in Georgia orange-trees freeze in the open air, and this plant cannot be safely cultivated farther north than South Florida. The mean temperature of Savannah corresponds to that of Cadiz; but in South Spain the cotton shrub lives through the winter, whereas in the southern states of the Union it is killed off every year by the cold.*

Although the moisture is precipitated irregularly, each season has its days of wet weather and even of downpours: such days are more numerous in winter and during the early spring than at other times. Nevertheless, the most copious rains usually occur in the summer months. In winter the precipitation takes the form of snow in the New England states, and especially in Maine, where it lies hard on the ground at times to a depth of six or seven feet.

In general the rainfall may be said to be in direct ratio to the annual temperature, and is consequently heavier in the southern than in the northern states. It culminates in the interior of Florida, where it exceeds 60 inches; and by its abundance indicates the vicinity of the torrid zone.

In the upland regions of New England the mountains by which the moist winds from the east, that is, from the ocean, are intercepted, condense the atmospheric vapours, and are thus frequently wrapped in fogs. The Green and the White Mountains, with the Adirondacks, are the great cloud-makers, and for weeks together their summits remain veiled in mists.

The conditions are different on the Alleghanies of Pennsylvania and the highlands of the Carolinas, that is, throughout the section of the Appalachian system which is disposed regularly from north-east to south-west. In these regions the annual rainfall diminishes gradually, describing around the Appalachians extremely elongated concentric curves. While in New England, as in most mountainous regions, the rainfall increases with the altitude up to a certain height, the opposite phenomenon is observed in the Alleghanies. This is doubtless due to the same causes to which is attributed the uniformity of climate on both slopes. The ridges being disposed in such a way as to present no obstacle to the play of the winds, the aërial currents move parallel with the mountain ranges without impinging on them; hence the precipitation is deposited in the lower strata of the atmosphere. Thus the Appalachians scarcely affect the equilibrium of the climate, either as regards the rainfall or the temperature.

The meridian of the lines of magnetic declination, that is to say, the "agonic line," † or line of no variation, passes obliquely across the Alleghanies. Since the epoch when accurate studies began to be made on the movements of terrestrial magnetism, the exact coincidence between the magnetic and the true

* Range of the summer temperature at various points along the Atlantic seaboard:—

		Summer Temperature.		
	Latitude.	Maxima.	Minima.	Range.
Key West	24° 34′	89° F.	75°.4 F.	13°.6 F.
Charleston	32° 47′	89°.6	69°.6	20°
Philadelphia	39° 57′	94°	57°.2	36°.8
Boston	42° 21′	98°	58°.5	39°.5

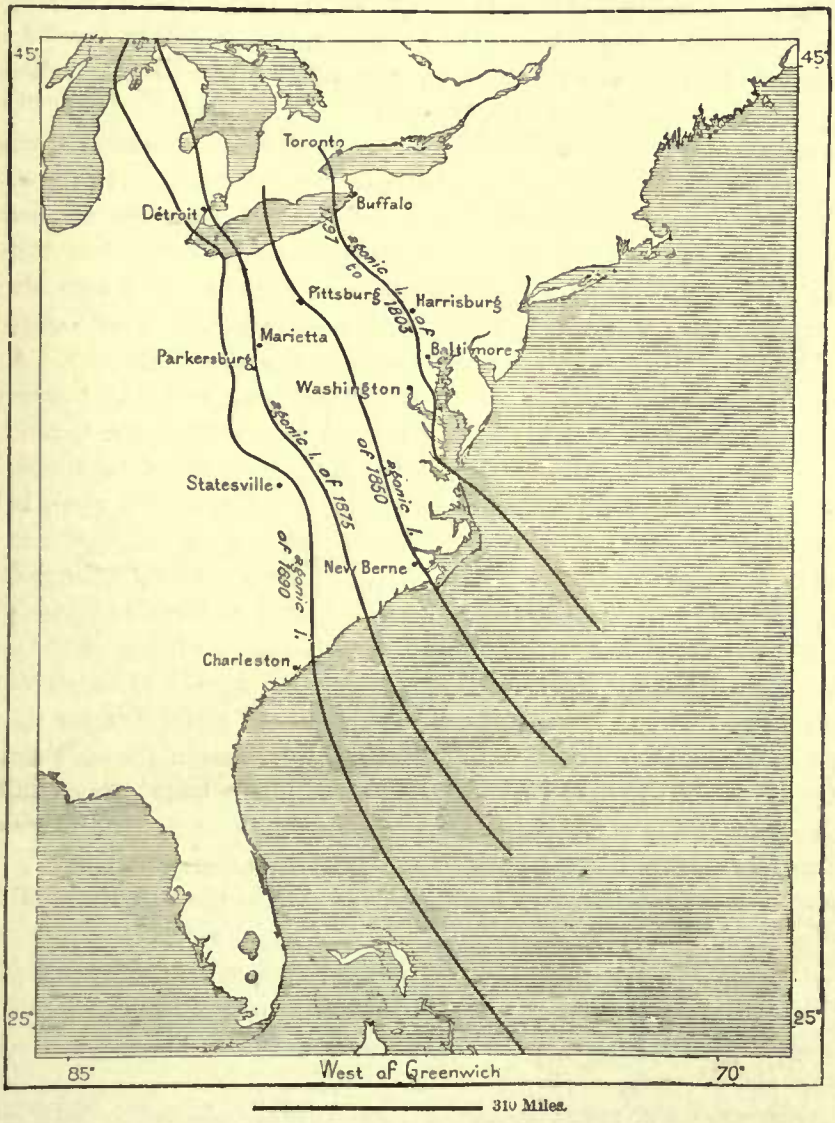
† Literally in Greek "angle-less," forming no angle with the geographical meridian.

north pole has always been observed to occur in this range. But the agonic line itself is being gradually deflected westwards. At the beginning of the century it passed near Harrisburg and Baltimore, now it is approaching Charleston.

Appalachian Flora.

The Atlantic coastlands and highlands, with the shores of Lake Superior, the Mississippi Valley, and parts of the Columbia basin, were formerly one of

Fig. 34.—Successive Displacements of the Agonic Line.
Scale 1 : 17,000,000.



the great forest regions of the United States. The wealth of large and leafy trees coincided with the abundance of humidity in the air and soil. Hence there are neither steppes nor prairies like those of the Far West in the Appalachians and on their eastern slopes. The land is everywhere sufficiently watered to support a

rich forest vegetation, and trees are absent only on the bare rocks and in the super-saturated marshlands. Here they are replaced by the bog-mosses and reeds.

On the whole, the Appalachian flora, forming a southern continuation of the Canadian, which itself greatly resembles the Scandinavian, presents a general physiognomy little different from that of Western Europe. The floral zones follow from north to south in accordance with the varying temperature. Thus the New England region differs little in its vegetable forms from the maritime provinces of the Dominion. A gradual transition takes place between Maine and the Lower Hudson valley, between the Adirondacks and the Mohawk and Alleghany Valleys. The latter river, a tributary of the Ohio, is regarded as approximately the boundary between two forest zones, whose forms intermingling about the parting line, give a charming variety to the surrounding landscapes. The two zones in question are those of Pennsylvania and of the conterminous Mississippi slope. On one side, that is, on the uplands of the Appalachian system, conifers are the prevailing species, and formerly the dominant tree was the *Pinus strobus* (Weymouth pine), which has now been extensively cleared by the woodman's axe.

On the coastlands of both Carolinas, the sandy tracts which here alternate with the marshlands, and which, like them, were at one time a marine bed, are clothed with vast pine forests, resembling those of the French Landes. But in this region the *Pinus barrens* is already found associated with the "cypresses," magnificent trees, characteristic of the marshy tracts from the Carolinas to Texas. These trees (*Cupressus disticha*) differ little from the gigantic *ahuehuetes* of the Mexican plateau. They shoot up with a straight, slender stem, bulging out at the base like the bulb of an onion, and they rest on the hard and solid supports which branch off from the upper part of the root to get a firmer footing in the slimy soil. In the pools of water which wash the enflated base of the trunk, little cones in the form of daggers rise above the surface of the muddy water. These "knees," from which the negroes use to make hives, are so many breathing organs, which proceed from the submerged roots; but for them the tree would perish, communication being interrupted between the main roots and the atmosphere. The top of the cypress expands in little branchlets clothed with pale green foliage, from which hang the long grey fibres of the "Spanish beard" (*Tillandria asneoides*), the characteristic feature of these forests.

In the cypress swamps, that have been invaded by the floods and killed by the submergence of the "knees," nothing now remains except greyish stems, and here and there withered branches, looking like gibbets, from which wave those streaming lichens which resemble the scalps of exterminated aborigines. The *Sabal Palmetto* (Palmetto palm) is also seen in the forests of the South Carolina and Georgian coastlands.

Farther south the transition to the tropical flora is effected in the Floridian forests, where the mahogany flourishes as in San Domingo, while the surrounding keys are fringed with mangroves like the Brazilian shores.

The United States woodlands present a far greater variety of species than those of Europe. From the Pyrenees to the Russian steppes there occur only one

or two varieties of the oak, one of the ash, one or two of the elm and birch, the same number of alders, and some twenty conifers. But in the Appalachian regions the Atlantic slope alone contains a larger number of forms.

In autumn, also, the North American forests far surpass the European in the

Fig. 35.—Appalachian Scenery—View taken at Hall's Ledge.

splendour of their tints, lovely as these are, with their yellow, red, and golden foliage. The American trees clothe themselves at this season in the most gorgeous array, with an endless gradation of bright and dazzling colours, violet, purple, orange, golden-yellow, blood-red, and others. The contrast is doubtless due to the temperature, which, being subject to greater extremes than that of West

Europe, either retards or stimulates more vigorously the development of the colouring pigments. The woodlands, and especially the oaks and maples, seem to be entirely clothed with a mantle of bright flowers, and if a still green or an evergreen tree obtrudes itself in the midst of the surrounding purple or golden foliage, it is festooned by bignonias or wild vines, which from its topmost branches fling their gay-coloured wreaths and garlands in endless profusion.

Appalachian Fauna.

The large animal species have almost disappeared from the eastern regions of the Union. The northern parts of New England alone still shelter in their deep solitudes the three Laurentian members of the deer family, the wapiti, or *Cervus Canadiensis*, the moose, or orignal (*Cervus alces*), and the caribou, or American woodland reindeer (*Rangifer caribou*). Elsewhere in the Appalachian zone the only large-sized wild beasts that still survive, and these only in the more remote districts, are the cougar (panther) and the bear.

A remarkable species met neither north nor east of the Hudson is the Virginian opossum (*Didelphis Virginiana*), the only local representative of the marsupial family, which is now chiefly confined to the Australian continent. The *Conurus Carolinensis*, a species of parrot formerly common in Carolina and the Central States, has retreated farther south, and is now seen only in Georgia and Florida. The latter state, which in its flora is half West Indian, belongs in its fauna also to some slight extent to the Mexican and West Indian zone. Thus the white crane, a bird tall as a man, which was thought to be confined to the Mexican coastlands, also inhabits those of Florida.

Taken as a whole the Atlantic zone of the United States possesses a large number of rodents; it is also very rich in fluvial fishes and molluscs. But there is no species of reptile and only one amphibian exclusively confined to this region. North American naturalists have verified the fact that the mice, squirrels, marmots, hares, and other species of rodents inhabiting the wooded tracts are occasionally subject to parasitic diseases, from which only a small number of the race escapes. But on the other hand the rodents multiply in favourable years to such an extent as, so to say, to cover the whole land. At such times the squirrels of New England and the Adirondack uplands may be seen migrating in prodigious numbers south-westwards, traversing the Appalachian forest regions as far as the wooded districts of East Tennessee. The exodus begins towards the middle of the month of August, and goes on continuously to the end of December.

CHAPTER IV.

STATES AND TOWNS OF THE ATLANTIC SLOPE.

1.—Maine.

THE state which forms the north-east extremity of the Union, projecting northwards between Canada, properly so-called, and New Brunswick, belongs territorially to the group of colonial provinces which wrested their independence from Great Britain; but at that time it did not form a separate state, being dependent on Massachusetts, to which it had been assigned in the middle of the seventeenth century. Maine, so named officially in the reign of Charles I., doubtless because it had already been so designated by its first French settlers, did not take rank amongst the states till the year 1820. In point of extent it comprises more than half of the whole region of New England; but the surface of the land, standing at a mean altitude of 600 feet, is in great part occupied by mountains, moraines, lacustrine plateaux, and kames. These rough lands were of little use except as fishing and hunting grounds and for the produce of the forests; nevertheless, some tracts have already been brought under cultivation.

Since the middle of the century the population of Maine has increased very slowly. During the decade of the Civil War it even diminished, partly through emigration, partly through losses on the battlefield. During the fifty years from 1840 to 1890 the whole of the population has increased by less than one-fourth. There would certainly have been a falling off had the French-Canadians not compensated for the loss by resorting as artisans to the industrial towns, and as farmers to the districts bordering on the Dominion.

Besides the Franco-Canadians there are very few foreigners in the state. The only aborigines are a few Passamaquoddy and Etchemin families dwelling on the banks of the Saint Croix River in the neighbourhood of Calais. The "Maine law," adopted in several other states, shires, and towns, absolutely interdicts the use of alcoholic drinks of all kinds on sanitary and moral grounds.

Maine, the surface of which was formerly covered by a vast forest (whence the expressions "Lumber State" and "Pine Tree State"), was at one time the most important for its shipbuilding industry. But most of the dockyards have been closed since iron and steel have so largely replaced wood in the construction

of the shells of vessels. Maine, however, is surpassed only by Michigan, Wisconsin, Oregon, and Washington for the lumber trade generally. Its fishing and commercial shipping is second only to that of New York, although its general trade remains far inferior to that of the large states on the seaboard.

Thanks to its indented shores, protected by chains of fringing islands and islets, Maine surpasses all other states of the Union in the number of its spacious,

Fig. 36.– Kames of Maine and New Hampshire.

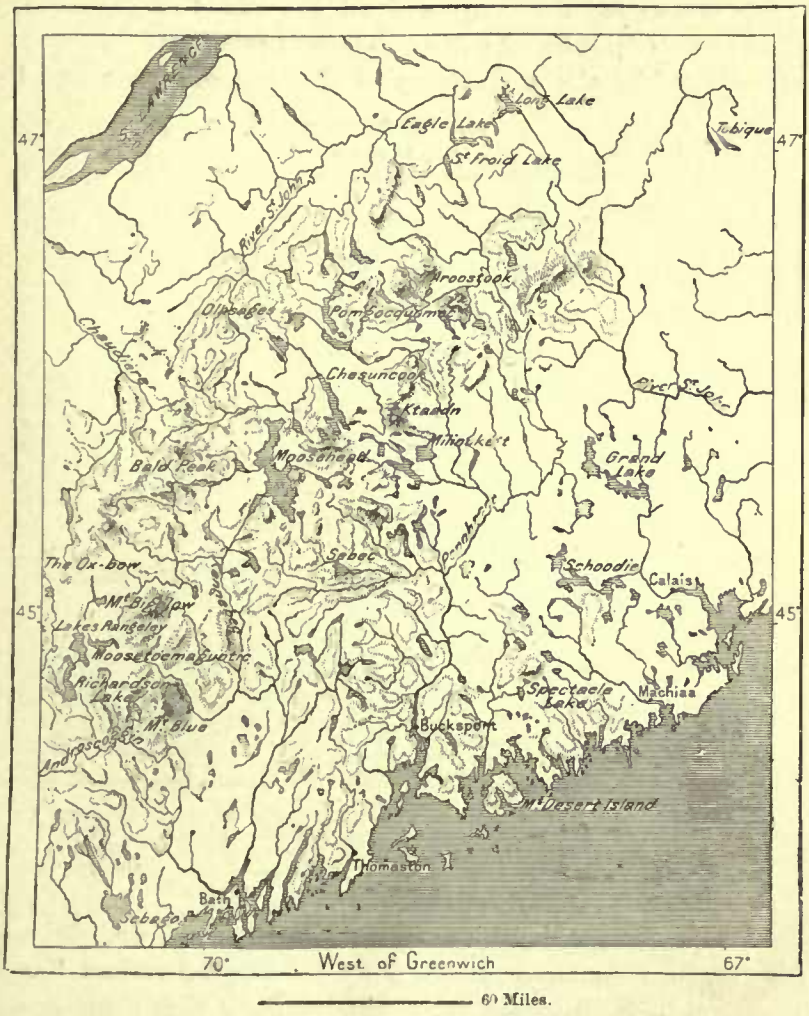
Scale 1 : 4,000,000.

deep, and well-sheltered harbours; but they have the disadvantage of being blocked by ice for some months, or at least for several weeks, in the year.

All the towns in the interior resemble one another. Constructed almost exclusively of wood, as is natural in a forest region, and generally surrounded by huge piles of logs, planks and other lumber, they stand usually on the margin of some torrent, whose falls set in motion the wheels of numerous saw-mills and other factories. *Calais*, northernmost of these towns, lies on the right bank of the Saint Croix, over against the Canadian settlement of Saint Stephens, with which in fact it forms a single town.

Bangor, although lying on the Penobscot river some 60 miles from the Atlantic, is a seaport much frequented by North-American skippers. Its trade in sawed timber is the largest in the state. Sea-going vessels ascend as far as the bridges, above which the Kenduskeag tributary of the Penobscot supplies the motive power employed in the saw-mills, foundries, and machine factories of Bangor; in 1890 the river traffic reached considerably over two million tons.

Fig. 37.—Maine.
Scale 1 : 3,500,000.

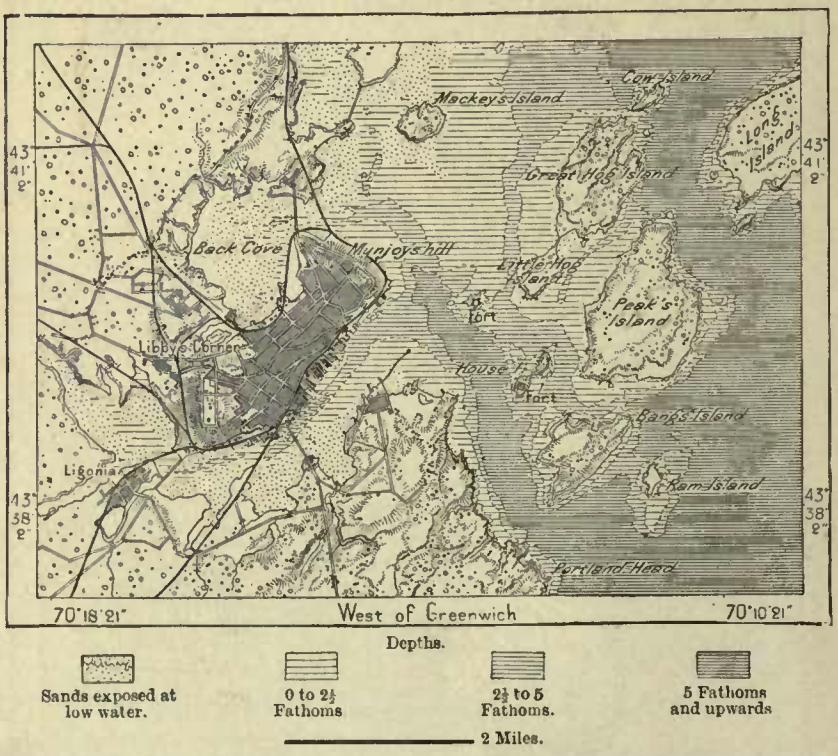


Augusta, capital of the state, and one of the prettiest little places in New England, stands on the Kennebec 42 miles from its mouth, and is another considerable centre of the lumber trade. It consists of one business street with continuous rows of houses, and a number of villas scattered amid the woodlands along the banks of the winding stream and on the slopes of the neighbouring hills. The highest eminence, rising clear above the surrounding vegetation, is crowned by the white walls of the "State House" or capitol.

Lewiston, on the Androscoggin, one of the largest places in Maine, and an important industrial centre, forms with *Auburn*, on the opposite side of the river, an aggregate rivalling Portland in the number of its inhabitants. *Bath*, which commands the converging valleys of the Androscoggin and Kennebec, enjoys the advantage of a spacious harbour often almost free from ice throughout the winter. It was formerly noted for its stoutly-built coasters and fishing-smacks; but in recent years it is gradually being transformed from a ship-building to a manufacturing centre. The neighbouring little town of *Brunswick* has become famous for the Congregational Bowdoin College, whose founder bequeathed to the establishment a fine collection of paintings.

Portland, the chief city and true capital of Maine, occupies a grand position

Fig. 38.—PORTLAND.
Scale 1 : 120,000



on a terraced peninsula, between two creeks in the deep and well-sheltered Casco Bay, the finest natural haven possessed by the North American Union on the Atlantic seaboard. South-east of the city the schistous cliffs plunging sheer into the water enclose a broad space rarely blocked by ice, and accessible to vessels drawing 20 feet. Beyond the harbour properly so called, the roadstead, well protected by numerous islands and defended by three fortresses, is deep enough to accommodate ships with a draught of over 33 feet.

Portland is one of the stations of the Canadian ocean steamers during the winter months, when the St. Lawrence is obstructed by ice. But its chief trade is with the West Indies and South America. Like the neighbouring port of

Falmouth it also forwards millions of live lobsters to England every year. North of Boston, Portland is the chief seat, not only of trade and industry, but also of letters and the arts. Its inhabitants take pride in adorning their city with fine monuments, statues, avenues, parks, and gardens. The surrounding cliffs terminate above the sea in the headland of Munjoy's Hill, which the citizens have had

Fig. 39.—Parallel Islands and Peninsulas North-East of Portland.
Scale 1 : 260,000.

the good taste to leave intact with its crown of erratic boulders. Longfellow was a native of Portland.

In the southern part of the state the two towns *Biddeford* and *Saco* face each other on the opposite banks of the Saco below its falls, and correspond to Calais, Bangor, and Lewiston in the north, being like them busy industrial centres and seaports engaged in the coasting trade.

Maine also possesses numerous temporary towns, or watering places, visited during the summer season by large numbers of people from New York, Pennsylvania, and Washington. The lacustrine regions and the northern forests are

amongst the most frequented resorts ; but without going so far afield, strangers may find many charming retreats at the very gates of the coast towns. Some idea may be formed of the endless variety of scenery, and of the ease with which it may be visited by steamers or sailing craft, from the panoramic view of the lovely Casco Archipelago, with the surrounding ramparts of wooded cliffs, pro-

Fig. 40.—White Mountains.
Scale 1 : 300,000.

jecting seawards in the form of long parallel headlands. The great island of Mount Desert, on the north side, is the largest and the best-known to bathers.

2.—New Hampshire.

New Hampshire, which still bears the name of an English county, reaches the sea only at its south-east extremity. To a much larger extent than Maine it is covered with mountains, to which it owes its familiar name of the Granite State. Mount Washington, culminating point of New England, lies within its borders, and on the west side it is separated by the Connecticut River from Vermont, another

mountainous region of irregular quadrilateral form, limited northwards by the Dominion of Canada and southwards by Massachusetts.

Vast forests still clothe the slopes of the mountains, and here flourishes the species of maple which supplies the Boston market with maple sugar. Organised as a separate colony so recently as 1741, New Hampshire, one of the thirteen original states, has remained one of the smallest in superficial area and population. About one-tenth of the population consists of French Canadians, grouped in the industrial towns, or replacing the Anglo-Americans, on the abandoned farmsteads.

As in Maine, the centres of population have mostly sprung up in the neighbourhood of the falls, whence water-power could be obtained, and along the lines of river navigation. Thus *Dover* was founded at the foot of the falls, on the Cocheco affluent of the Piscataqua, and *Portsmouth*, the only seaport in the state, took its rise on the south bank of the river, which here expands into a broad, deep and well-sheltered estuary. But although easily accessible to large vessels, Portsmouth, lying between Portland and Boston, is far outstripped in commercial development by those two great seaports; its coasting trade scarcely exceeds a yearly movement of about 200,000 tons. The government possesses a dockyard opposite the town on the Kittery peninsula within the Maine frontier. Portsmouth and Dover, both founded in 1623, are the oldest places in the state.

Concord (the Indian *Penacook*), present capital of New Hampshire, is a manufacturing town lying on both banks of the Merrimac, and noted for its coach and spinning factories and quarries. Other industrial towns follow farther down, at all the falls and rapids of the river. Such is *Manchester*, which though scarcely justifying the name given it by its ambitious residents, has nevertheless become the first city in the state, the centre of a great variety of industries, such as cotton, muslin, and cloth weaving, locomotive building, and machinery works.

In the interior of the state the large hotels and the groups of villas, scattered over the uplands, and farther north towards the Canadian frontier, often contain in summer a shifting population far larger than that of the towns on the lowlands and along the sea-coast. The natives of these uplands have scarcely a more profitable occupation than that of receiving and providing for their summer visitors. Still they also pursue a few local industries; in the cabins near *Dixville Notch* is prepared one-fourth of all the potato starch produced in the United States.

3.—Vermont.

The State of Vermont, which preserves its old French name, resembles New Hampshire in its quadrilateral form, limited by geometrical lines, except on the east side where the frontier coincides with the course of the Connecticut river, and on the north-west where it is separated from New York by Lake Champlain. Vermont is not one of the thirteen original states, as it was not constituted till the year 1791, after long discussions. The highland population, occupying parts of the conterminous states of New York and New Hampshire, had maintained their autonomy as an independent little commonwealth, and were accepted into

the Federal Union on their own terms. The Green Mountains, traversing the state from north to south, divide it into two nearly equal parts.

Although abounding in falls and rapids, which afford an enormous water-power, Vermont has developed but little industrial life. It is above all an agricultural region, partly pastoral, partly under tillage; its sheep yield a very fine wool, and from its quarries are extracted magnificent building materials largely used in New York and Boston. The crude cultivation of the ground has at last exhausted the best lands, and the rural population has had to emigrate in large numbers in quest of other farmsteads in the unreclaimed regions of the Far West.

Having no seaward frontage, Vermont has no foreign trade except with Canada, carried on chiefly through the highway of Lake Champlain, on which navigation is very active. Owing to these circumstances the population of Vermont has increased less rapidly than that of any other of the eastern states; during the last twenty years it has even remained at a standstill. There would have been a serious falling off, had not the Canadians, and especially those of French speech, filled the place of the emigrants as factory hands, day labourers and buyers of small holdings.

Vermont has no large towns. *Montpelier*, the capital, enjoys no advantages beyond its somewhat central position in the state in a fertile upland valley watered by the Winooski affluent of Lake Champlain. *Burlington*, which has the largest population (15,000), stands on the very margin of the lake, and from its terraces is unfolded a vast prospect of islands, straits, inlets, and wooded banks stretching away to the north and south, and dominated by the Adirondack uplands.

Burlington is the centre of the lake traffic, especially for the import lumber trade with Canada. *Saint Albans*, lying farther north and a few miles from the lake, forwards dairy produce to the surrounding markets. *Rutland* commands the passes to the south of the chief group of the Green Hills, where highly-prized marbles are quarried. Lastly *Bellows Falls*, a busy place on the banks of the Connecticut, here obstructed by cascades and rapids, is one of the more important centres of the state.

4.—Massachusetts.

Massachusetts (*Mos-Wachusett*) was so named, say etymologists, from the Wachusett peninsula on which Boston was founded, and which from its form was called Mos, or "Arrow-head." From the station the name passed to an Indian tribe, then to the white colony collectively, and so to the state. But by others the word has been interpreted in the sense of "Hilly Land." The official title by which Massachusetts is distinguished from all the states qualifies it as the "Commonwealth" in a pre-eminent sense.

Another name by which it is familiarly known to all Americans is "Bay State." During the early days of the colonisation, the inhabitants lived chiefly

by fishing and trade; hence they depended for their supplies on the "Bay," and the national emblem was the cod. The people themselves also call their territory "Old Bay State," and with a somewhat fonder touch, the "Mother State." The term is well justified, for here was first raised the cry of independence; from here also went forth the Abolitionist propaganda, which never rested till it had destroyed the institution of slavery, while maintaining the federal union between the northern and southern republican communities.

In many other respects also, Massachusetts is the "Mother State." Relatively to its size, it has contributed more than the other original states to the peopling of the western lands. It has also taken a larger share in the development of industrial processes and discoveries. Lastly, education has made greater progress than elsewhere in the Union, and Massachusetts' female teachers especially have found employment in every part of the republic. Of 14,245 Americans classed as "celebrities" in Appleton's *Cyclopædia of American Biography*, 2,680, or rather less than a fifth, were natives of Massachusetts.

The "Old Bay State," small in extent since the loss of Maine, forms a narrow parallelogram of geometrical outline between the Taconic hills and the sea. But it projects on the Atlantic side in such a way as to embrace the whole coast from the Merrimac estuary to Nantucket Island and the approaches to Narragansett Bay. From decade to decade it also slightly increases in extent, thanks to the drainage operations, by which a zone of saline lagoons fringing the coast is being gradually reclaimed and brought under cultivation.

But however small in extent, relatively to other states, the territory of Massachusetts is, with the district of Columbia and Rhode Island, the most densely-peopled part of the whole Union. Its density per square mile, far superior to that of France, is only slightly exceeded by that of the British Isles. Nevertheless, during the last few decades, the population has grown less rapidly by the natural increase of births over deaths than by foreign immigration, especially from Ireland and French Canada. The inhabitants, who are fond of calling themselves the children of the "Pilgrim Fathers," now really form a very mixed community. The tendency of the rural populations to gravitate towards the manufacturing centres has been attended by a corresponding decay of agriculture. In 1890 a special commission reported that 1,461 farms, comprising a total extent of about 130,000 acres, had been abandoned.

The Merrimac, penetrating from New Hampshire into the northern part of the state, traverses a densely-peopled district; factories are grouped round all its rapids, and *Lowell*, one of these busy centres, disposes of an enormous water-power, representing about 20,000 horse-power, derived from the falls of the Merrimac, and of its tributary the Concord. Spinning, weaving, and dyeing are the chief industries; but every branch of manufactures is represented in Lowell, which contains the most important group of factories in Massachusetts.

There was a time when this place was vaunted as the paradise of workmen, and especially of working women. When the factory system was first introduced into North America travellers celebrated in an idyllic style the pleasure of

work in the Lowell mills; but its spinning factories now resemble those of other lands. In the early period the artisans of both sexes were entirely in the hands of directors of companies, who supplied them with board and lodging, required them to observe the Sabbath strictly, and forbade them to frequent the theatres or any places of amusement. Nevertheless, the happiness of these privileged factory girls cannot have been complete, for the spinning mills have been almost entirely abandoned by native Americans, who are now replaced in the "Paradise Lost" by Irish and especially Canadian women of French speech.

It is much the same at *Lawrence*, which stands ten miles lower down on both banks of the Merrimac. Here the river has been raised by means of a strong dam, and water-power has thus been obtained to drive the machinery of numerous spinning mills, foundries, and other workshops. *Haverhill*, which follows Lawrence in the same valley, stands at the converging point of two industrial provinces, Lowell for cottons and *Lynn* for the boot and shoe business. These industries are also shared in by *Newburyport*, at the mouth of the Merrimac, which has lost most of its fishing and coasting trade. The harbour is inaccessible at low water to vessels drawing more than nine or ten feet.

Newburyport in fact has been eclipsed by *Gloucester*, which occupies a sheltered position on the south side of the peninsula of Cape Ann, 28 miles north of Boston. Soon after its foundation, in 1624, Gloucester became the most flourishing seaport in the colony; this rank it still holds so far as regards the herring and mackerel fisheries, while it yields only to Boston in the extent of its mercantile marine (35,000 tons register).

On the Atlantic seaboard, nearly midway between Gloucester and Boston, stands the historic town of *Salem*, which occupies a position at the neck of the Marblehead promontory, sheltering it from the south and east winds. Founded in 1626, on the site of the Indian village of *Naumkeag* ("Eel-pond"), Salem ranks as the mother colony of north Massachusetts, and to some settlers from this place Boston itself owed its origin four years later. This ancient stronghold of the Puritans, now chiefly engaged, like Lynn, in the manufacture of boots and shoes, formed with *Marblehead*, during the last century, the chief centre of the foreign trade for the whole of New England. It enjoyed a practical monopoly of all the exchanges of the Republic with the extreme east, and the Cape of Good Hope was yearly doubled by over fifty vessels forming part of its commercial navy. An eastern museum full of curious objects from India and China recalls this glorious period in the local history.

Salem ranks high amongst the cities of the Union for the number of its illustrious citizens, amongst others Nathaniel Hawthorne, and the historian Prescott. Its dependency, Marblehead, has, like it, lost its trade, and its harbour, a trysting place for yachtsmen, has now been deserted by trading vessels.

Salem is followed south-westwards by *Lynn*, another trading and industrial town, which stands at the neck of the Marblehead promontory. This place takes its name from the English town of Lynn Regis, whence came its first pastor in the year 1629. No other town is occupied more extensively with leather

work, and especially the manufacture of women's and children's shoes, employing nearly two hundred factories in this department. The smell of leather is diffused beyond the town over the surrounding plains, and in the harbour is mingled with that of fish. Most of the work is now done by machinery, which almost entirely dispenses with manual labour, except such as can be performed by women and children in the finishing workshops. The industry

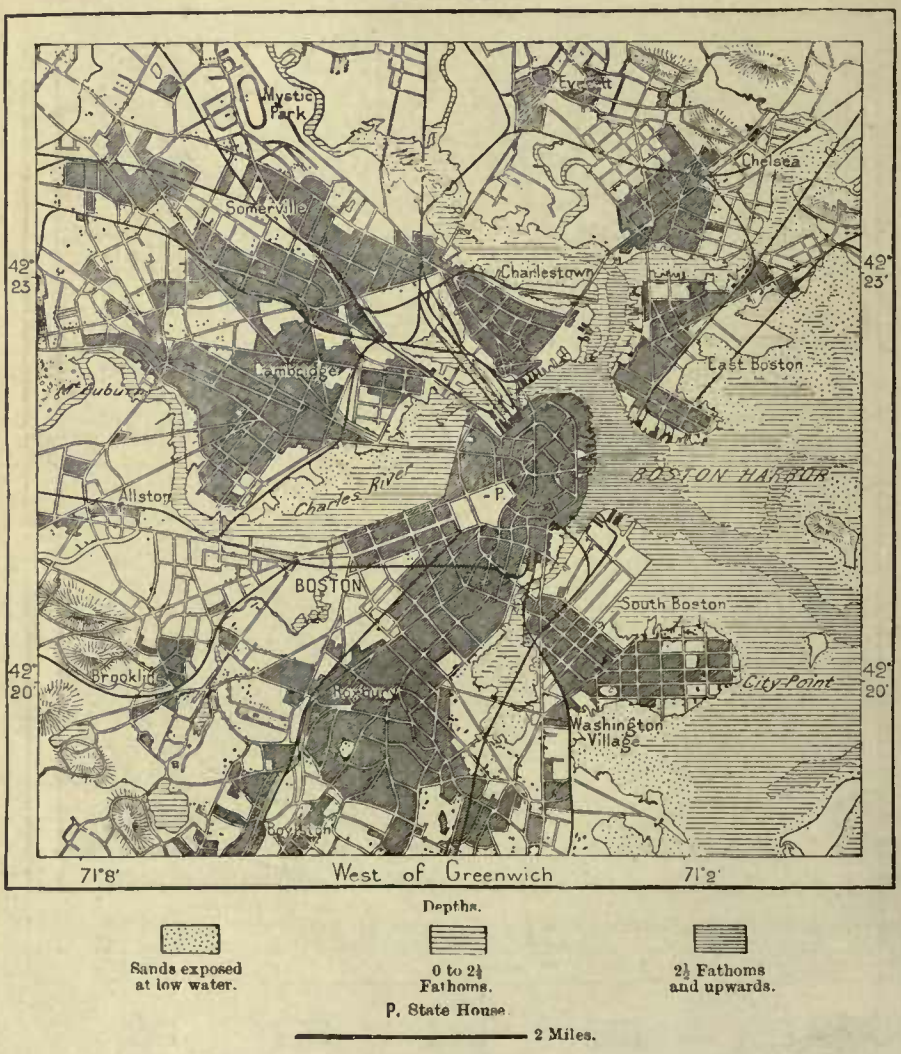
Fig. 41.—Salem and Lynn.
Scale 1 : 150,000.

dates from the last century, and the annual product has increased from 80,000 pairs of boots and shoes in 1767 to 26 millions in 1890.

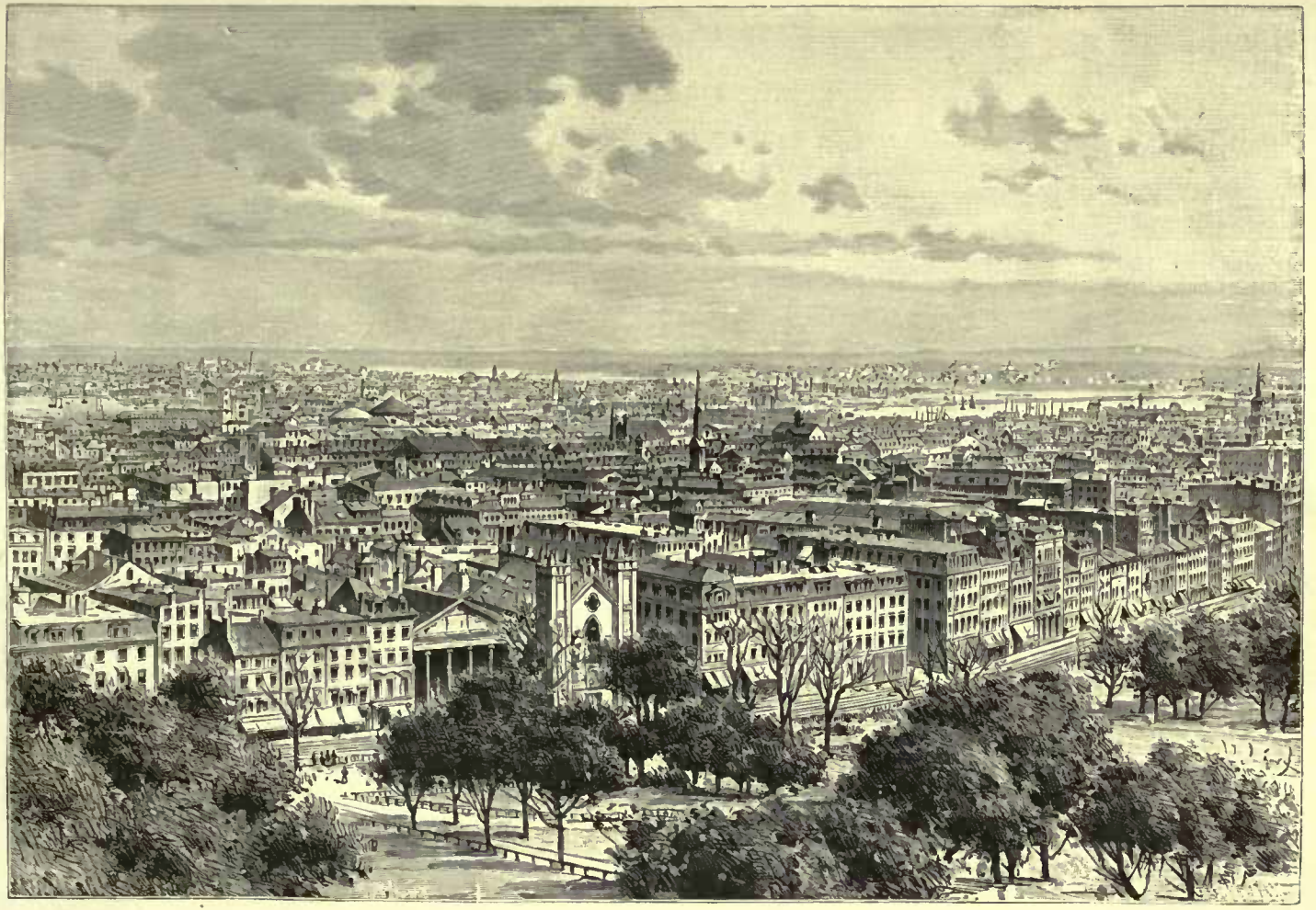
Boston, named from the Lincolnshire Boston, formerly Botolph's Town, is at once the capital of the state, its largest city, and the metropolis of New England.

It consists in reality of several urban groups separated from one another by arms of the sea. The first settlement began in 1623 with the log hut of a pioneer, who "wanted neither bishops nor Puritan brethren for masters." Hence the arrival of these "brethren" drove him farther afield, while Boston grew to a little hamlet built on a peninsula, which was connected south-westwards with the mainland by a spit of sand almost flush with the surface.

Fig. 42.—Boston.
Scale 1 : 100,000.



The original peninsular quarter, the Shawmut, or "Sweet Waters" of the Indians, is officially known by the name of *Trimountain*, or familiarly Tremont. But of the three hills whence the central nucleus of Boston took this poetic designation, one only now remains, the Beacon Hill, 140 feet high, crowned by the glittering dome of the State House. The Shawmut peninsula occupied a space of 800 acres, which has since been more than doubled by reclaiming and



GENERAL VIEW OF BOSTON, TAKEN FROM THE COMMON.

raising the level of the land about its sandy neck, and thus creating a platform on which a great part of modern Boston now stands. Whenever the city requires new sites for its buildings, squares, or gardens, it obtains them in the same way by encroaching westwards on the shallow waters of the Charles River estuary.

Similar operations have been carried out on the other sides of the bay, which as outlined by the high beaches, the gravels and cliffs of the original shore, was nearly twice as large as the present bay. Marshy tracts, flooded to a depth of a few inches at high water, continually advanced beyond the shore-line seawards, and these swampy grounds are now in their turn disappearing.

The Beacon Hill peninsula with all these added spaces is connected with the mainland at the point where formerly stood the separate municipality of *Roxbury*. But this place, as well as *Dorchester* and some other coast towns and villages, has been absorbed in the ever-growing metropolis. North of Boston the old city of *Charlestown*, which formerly was also an independent urban community, is similarly annexed to the central municipality, and although its hill, now covered with houses, remains separated from the main quarter by a marine inlet, this channel is crossed by so many piers, viaducts, and railways that it almost entirely disappears. The whole surface might easily be covered over by a broad platform connecting together the various bridges running in different directions.

West of the bay other centres of population have also become quarters of Boston, whereas *Brookline* and the large suburb of *Cambridge* continue to be administered by separate municipalities, although Cambridge at least really forms part of the "Modern Athens," and is even its intellectual centre. On the north side of the bay Boston overflows in all directions with new suburban districts; eastwards and south-eastwards also two islands, now connected with the mainland, have been covered by the extensive suburbs of East and South Boston. In fact there is scarcely one of the fifty rocks and islets of all sizes scattered over the roadstead that is not a direct dependency of the capital through their lighthouses, lightships, fortifications, hospitals, or other public establishments.

This rapid growth of the metropolis of Massachusetts on a seaboard partly marshy and studded with islands produces continual modifications in the plan of the city, so that charts even of recent dates present some striking contrasts. The present city is thirty or forty times more extensive than the original islet. It would even be still larger were all the groups to be included which have sprung up in connection with the capital in the surrounding district. Within a circumference of twelve miles round Beacon Hill, is comprised a territory which contains over a third of the population of the state; for this territory the census of 1890 returned 872,482 souls, or nearly two-fifths of all the inhabitants of Massachusetts.

On this basis Boston is consequently the fourth city of the United States; but although inferior in actual population to New York and Brooklyn, to Philadelphia and Chicago, it surpasses them in its general influence on the moral tone of society, in political enterprise, literary and artistic activity. Its citizens have given it the name of the *Hub*, and even the *Hub of the Universe*, as if it were the pivot on which everything turned; Cambridge on its part is the *Hub of the Hub*.

From whatever quarter Boston is approached, the visitor perceives the golden dome of the State House crowning the summit of the islet where the settlement was founded, and affording the most commanding view of the surrounding panorama of towns and wooded slopes, of the spacious bay studded with archipelagoes and islets, and alive with shipping. The *Common*, an open space of about fifty acres, occupies the hill surmounted by the State House. This is almost sacred ground, the spot on which has been, to a large extent, evolved the political and social history of New England. In the early period it was the scene of sanguinary spectacles, such as the butchery of as many as thirty Indian captives in a single day; here also, during the witchcraft craze, several victims were sacrificed to popular superstition. And here also was prepared the revolt against the mother country, and round about or in the vicinity of this pre-eminent historic site, the Bostonians have erected the City Hall and the other chief monuments and statues which commemorate the great events of their history. Not far off stands the American "Cradle of Liberty," Faneuil Hall, so named from its foundor, a French Huguenot, which perpetuates the memory of the popular gatherings and of the stirring addresses here delivered by the great orators and champions of the rights of man. Another famous monument is the obelisk on Bunker Hill,* crowning the highest ground in Charlestown, and recalling the valiant resistance opposed by the first raw recruits of the "rebels" to the troops of Great Britain.

The centre of the growing metropolis can never be displaced, for the very conformation of the surrounding land maintains it in the original Shawmut peninsula. But, like the City of London, this centre is acquiring more and more the character of an exchange, the focus of business for all the neighbouring urban groups. The buildings that have here risen in imposing style from the ashes of the tremendous conflagration of 1872, comprise almost exclusively business offices occupied only for a few hours during the day. Hence a prodigious flow of population in the morning, followed by a corresponding ebb in the evening. In no city are pedestrians and vehicles of all sorts crowded together in larger numbers in a narrower space, and as many as sixteen hundred public conveyances pass certain spots in a single day. Thus the project of piercing the hill in all directions becomes daily more urgent; in no other way can relief be afforded to the congested traffic.

Since the year 1869 the city of Boston possesses a high school with the title of university. But the university which is the pride of Massachusetts lies, not in the metropolis itself, but in the city of Cambridge beyond the Charles River. This flourishing academy of the arts and sciences bears the name of Harvard, in memory of a benefactor, who bequeathed to it his library and a sum of money in the year 1638. A very fine but fanciful statue of the donor stands on a piece of ground within the college precincts. The recent progress of this school of learning has been marvellous. Harvard is now a town within a town, comprising lecture-rooms, amphitheatres, laboratories; the two splendid museums of zoology (Agassiz)

* An Anglicised form of the French-Canadian *Boncœur*; hence *Bunker Hill*, not *Bunker's Hill*, as it is often written.

and archæology (Peabody); palatial residences for the staff and students; a refectory, one of the finest structures in the United States, raised to the memory of the alumni who fell during the War of Secession; gardens, park, and grounds for gymnastic exercises; a college for about two hundred female students.

The astronomical observatory attached to the university is one of the richest and best directed, and already supplies scientific observers to other establishments in the New World as far distant as Arequipa in South Peru. A remarkable

Fig. 43.—Boston Harbour.
Scale 1 : 300,000.

botanic garden is also one of the numerous foundations, and the university possesses, if not the largest, certainly the most select and the best consulted, library in the United States. In 1890 it contained nearly 376,000 volumes and 300,000 pamphlets. In the same year the capital of the university exceeded $7,120,000, and the revenues from all sources $2,805,000, while the professional staff numbered 186 and the students 1,341.

The directors of this great institution scarcely make an appeal to the public that is not at once responded to by donations or bequests from former students or

friends. Hence the legacies of the original benefactor are trifling compared to the present resources of the college, which was at first a purely theological school, but now embraces all the faculties.

Besides its two universities, Boston possesses a municipal library very much larger than that of Harvard,* a picture gallery, which would be remarkable even in Europe, a natural history museum, and a group of admirably organised technical schools. With all these literary and scientific advantages, Boston and Cambridge are naturally the most attractive places of residence in the states for men of science and letters. Franklin was a native of Boston, as were also Emerson, Wendell Phillips, Sumner, Parkman, and Edgar Allan Poe.

The vast harbour of Boston, which despite all the encroachments of the city still covers an area of 75 square miles, has over New York the great advantage of lying nearer to Europe. Hence, although it is not situated in the estuary of a magnificent fluvial artery, such as that of the Hudson, it remains none the less one of the great centres of international trade. The annual movement of the shipping frequenting its port exceeds three million tons, and the value of the foreign exchanges, relatively slight compared with the vast traffic carried on with other cities of the United States, represents over $100,000,000. Great Britain takes by far the largest share in these exchanges, and four-fifths of the European tonnage entering the harbour fly the British flag. The section of the harbour in the Mystic estuary north of Charlestown has been reserved by the Federal Government for dockyards and as a naval port.

Chelsea, which lies just beyond the north side of the bay, is one of those towns in the outskirts of Boston that have preserved their municipal independence. Nevertheless this place, which stretches north-eastwards to the Atlantic shore on the north side of the neighbouring peninsula, and which is separated from the capital only by the Mystic River estuary, is practically a suburb of Boston.

Farther east every creek, every height in the rocky Nahant peninsula is occupied by charming villa residences. Northwards also Boston is continued by the suburb of *Malden* through a sandy lacustrine district traversed by numerous railways. North-westwards follow the two historical towns of Lexington and Concord, the scenes of the first engagements between the British and Americans in the War of Independence. Thoreau, Emerson and Hawthorne all resided at Concord.

Near the village of *Watertown*, west of Cambridge and of the shady groves of *Mount Auburn* cemetery, a modern tower marks the spot where, according to Horsford, the Norse navigators founded their first settlement in the New World. Here, this writer thinks, stood Cabot's famous Norumbega, that is Norbega or Norway, the old buildings of which are represented by some crumbling walls. But Horsford's views have been rejected by most archæologists.

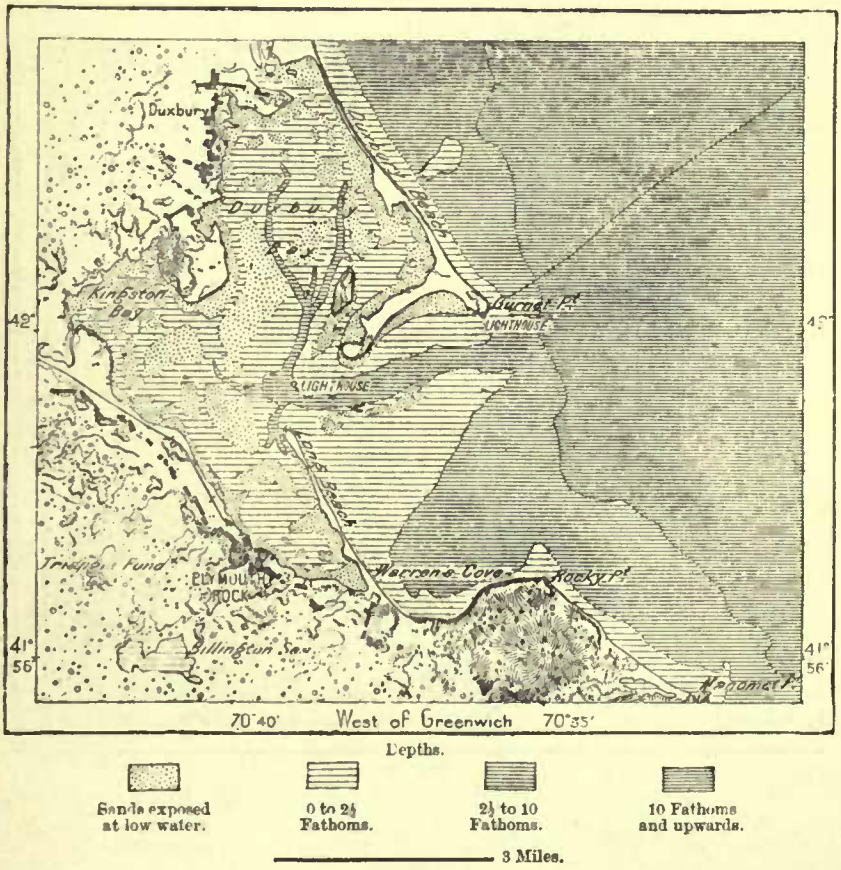
Farther on, at the point where the Charles River breaks into cascades, stands the suburb of *Waltham*, a very industrious quarter occupied specially in the manufacture of watches, of which as many as 1,500,000 are annually produced in this place. South-eastwards the towns of *Newton*, *Brighton*, *Brookline*, and *Roxbury*

* Boston library (1890), 540,000 volumes, 300,000 pamphlets.

are dotted over an extensive district diversified with woodlands, hills, grassy plains and lakes. Here are the chief reservoirs which supply Boston and Cambridge with water; one of these reservoirs alone, that of Chestnut Hill, contains 950 million gallons of water. In winter the frozen lakes, cut up by a sort of ice plough, yield thousands of tons of ice to the trade of Boston.

Towards the south-east *Quincy*, on the shores of the bay at the foot of an overhanging granite bluff, is noted as the place where the first railway in the United States was built, not as a passenger line, but in connection with the neighbouring

Fig. 44.—Plymouth and Duxbury.
Scale 1 : 170,000.



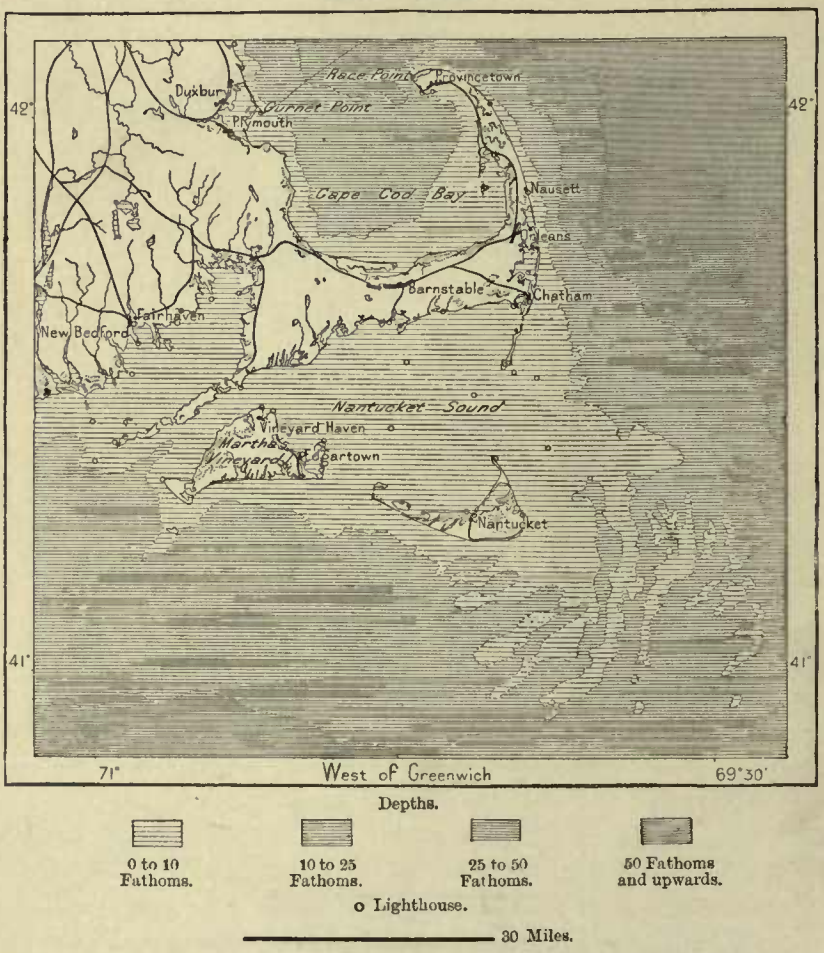
quarries of magnificent granite, now exported to every part of the Union. Quincy was the birthplace of John Hancock, of John Adams, second president, and of his son, John Quincy Adams. *Hingham*, a little watering place a little farther south on the same coast, possesses the oldest church in New England, dating from 1681.

On the coast stretching south-east from Boston, and sheltered from the Atlantic seas by the peninsula of Cape Cod, stands the famous city of *Plymouth*, where began the colonisation of New England in the year 1620. But this mother colony has lagged far behind many more modern places peopled by her children. It has only a small and shallow harbour frequented by some coasting

vessels and fishing smacks. "Old Colony" had no natural resources, and nothing is produced here except cordage and nails. Nevertheless Plymouth attracts visitors for its historic associations. An eminence rising above the houses is crowned with a colossal statue of "Faith." Some curious objects dating from the first years of the colonisation are carefully preserved in Pilgrim Hall, and Plymouth Rock stands on the sandy beach where the pilgrims landed from the *Mayflower* on December 21st, 1620. A detached portion of "Forefather's Rock," as it is also

Fig. 45.—Cape Cod.

Scale 1 : 1,500,000.



called, has been removed to the front of Pilgrim Hall, where it is protected by an iron railing from relic hunters.

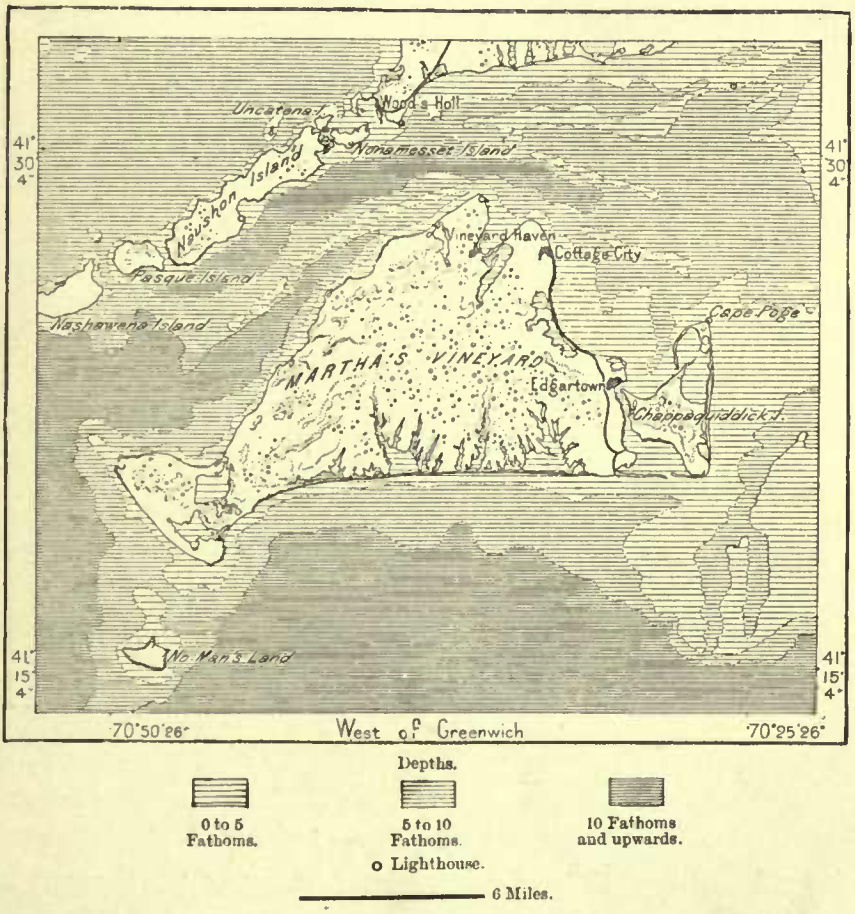
Duxbury, a little north of Plymouth, recalls the spot where the *dux* or "leader" of the Puritans resided. It is now better known as the American terminus of the French transatlantic cable, which was laid between Brest, Saint Pierre-Miquelon (Newfoundland) and Duxbury in the year 1869.

The narrow peninsula consisting of glacial drift and terminating in the long hooked headland of Cape Cod, has no centres of population except a

few little fishing ports, such as *Barnstable* and *Provincetown*, engaged especially in the cod and mackerel fisheries. These places are inhabited by a daring and skilful race of sailors, who are constantly warring with the boisterous elements in pursuit of their dangerous trade, or as life-boat-men rescuing the crews and passengers of vessels wrecked on these exposed sands. The shifting dunes, driving before the dry north-west winds at Race Point, are already threatening Provincetown, which has a hard struggle to protect itself against the invasion.

Between Buzzard's and Cape Cod bays a deep ship canal is being constructed,

Fig. 46.—Martha's Vineyard.
Scale 1 : 400,000.



which will enable vessels to ply directly between New York and Boston. The coasters engaged in these waters make some 40,000 yearly trips between the two great seaports, and when opened the canal will save them a détour of over 90 miles, in the dangerous vicinity of Cape Cod. The highest point of the cutting is only 62 feet above sea-level.

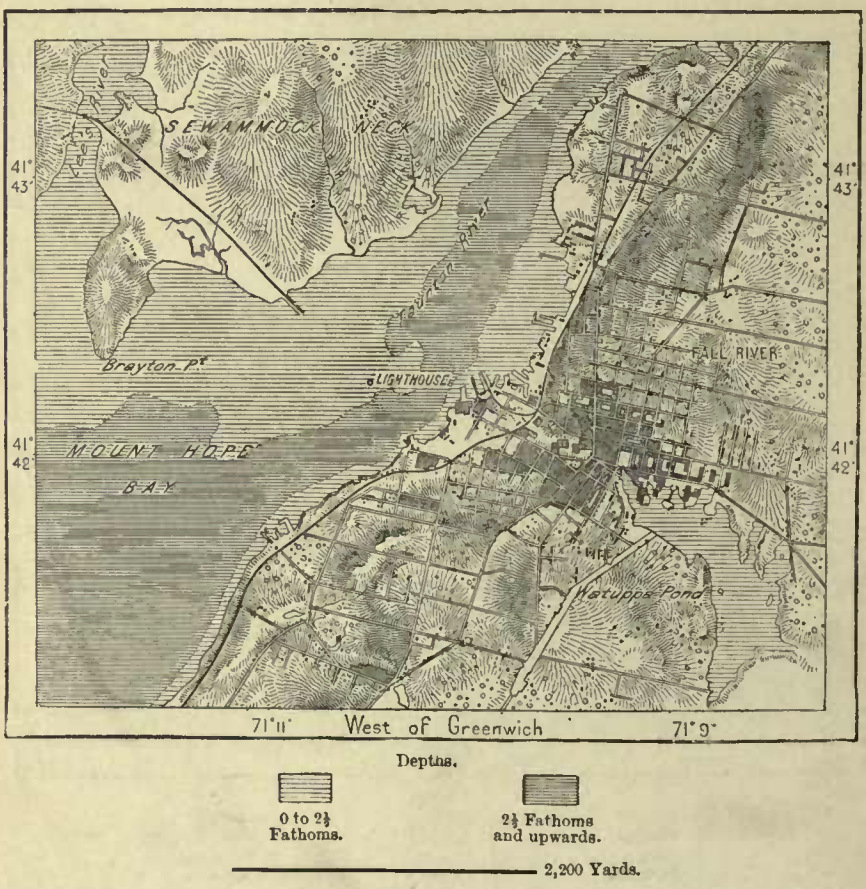
The two islands of Martha's Vineyard and Nantucket, which lie in the open Atlantic, south of Cape Cod peninsula, and which are often modified by the fury of the waves, have also their little fishing hamlets, which at a former epoch were

even famous. Before the War of Independence Nantucket owned 140 vessels, manned by 2,200 hands, all engaged in the whale fishery. To a great extent ruined by the war, the inhabitants had regained their former prosperity, when the profits of the whalers were again seriously affected by the development of the oil wells, combined with the gradual disappearance of the cetaceans.

From that time the population of Nantucket and of its neighbour, Martha's Vineyard, began steadily to diminish, the white inhabitants disappearing, as all

Fig. 47.—Fall River.

Scale 1 : 50 000.



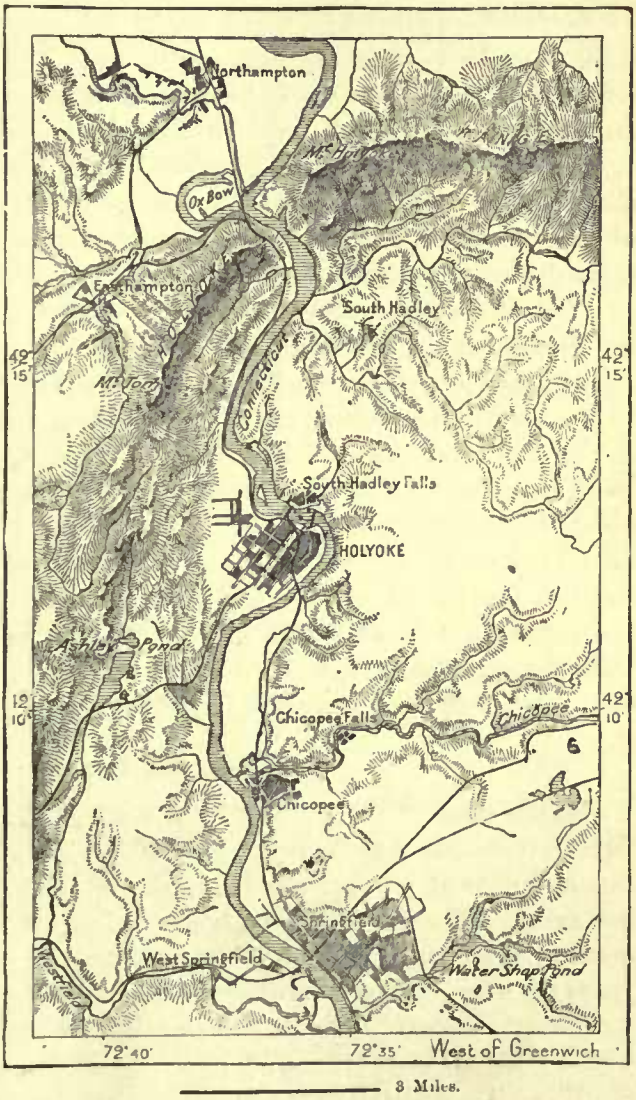
but a few still surviving half-breeds of the gentle Indian aborigines had disappeared before them. The two islands, however, are recovering some of their importance as watering places and summer resorts.

The former commercial enterprise of the islands has passed to the opposite mainland, where the harbour of *New Bedford*, well sheltered by the fringing islands, is accessible to the largest vessels. *Vineyard Haven* is still a harbour of refuge, while New Bedford, the *Acushnat* of the Indians, remains the most active whaling port in the world. It has, however, greatly declined in this respect since the middle of the century, when jointly with the town of *Fairhaven*, facing it on the opposite side of an estuary, it equipped over 300 vessels for the whale

fisheries, and when it gave employment to as many as 10,000 seamen. In 1890 the whalers had been reduced to 52, with a total burden of less than 13,000 tons.

Despite its losses as a fishing station, New Bedford is rapidly increasing as a manufacturing centre. It is engaged especially in cotton weaving, an industry which it shares with its neighbour *Fall River*, situated a little to the north-west on the east bank of the Taunton River. The estuary gives access to the largest vessels, and the town derives abundant hydraulic power from the cataracts of the Watuppa Pond emissary, which at present disappears underground.

Fig. 48.—Holyoke Gorge.
Scale 1 : 200,000.



West of Boston the city of *Worcester*, birthplace of George Bancroft, ranks in size and importance next to the metropolis itself. For this position it is indebted to its situation in the centre of the state at the converging point of the main lines of railway. Often selected as a convenient meeting-place for political conferences and conventions, Worcester has earned for itself the proud title of "Heart of the Commonwealth." It lies near a waterparting where the Blackstone River, after collecting its various headstreams, flows south-west towards Providence.

The Connecticut River, which traverses Massachusetts from north to south, is flanked by populous and industrial towns. *Northampton*, the *Nonotack* of the Indians, stands near the right bank of the river above the Holyoke gorge, in a charming valley where tobacco is grown. Here was born Jonathan Edwards, the

most famous Calvinistic divine of New England. Lower down, the large city of *Holyoke* lies within a bend of the Connecticut, by which it is encircled on three sides. Its numerous paper and other factories, extending over a space of more than three miles, give employment to some 20,000 hands, of whom over 5,000 are natives of Canada. Here are manufactured most of the envelopes and postal cards issued by the Federal Government. All the workshops derive enormous water power from a fall of over 30 feet effected by damming the current higher up.

Farther down other falls, together with the rapids of a little affluent, set in motion the wheel gear of the mills at *Chicopee*. Beyond this place follows the city of *Springfield*, where the United States' Government has its military arsenal, armoury, and chief manufactory of firearms on Armory Hill.

One spot, however, in the Connecticut Valley has hitherto escaped the invasion of factories and the proletariate classes. This is the quiet little rural town of *Amherst*, which, with its school of agriculture, and its art, natural history and archæological collections, occupies a secluded glen north-east of Northampton.

West of the Connecticut the hilly region about the sources of the Hoosic and and Housatonic is less densely peopled, and its towns, such as *North Adams*, *Pittsfield*, and *Stockbridge* are less busy industrial centres. But they are visited by summer pleasure seekers, and the surrounding districts are occupied by villas and rural retreats. The neighbouring thermal waters of *New Lebanon Springs*, which have their rise in the state of New York, are much frequented, thanks mainly to the vicinity of the famous community of Shakers, founded in the year 1795 by the "prophetess" Ann Lee. The town of North Adams, north of the Greylock Peak, stands at the issue of the Hoosac tunnel on the chief highway of communication between Boston and the Hudson valley. The construction of this underground passage, which is nearly five miles long, took twenty-four years, with an expenditure of about $20,000,000.

5.—Rhode Island.

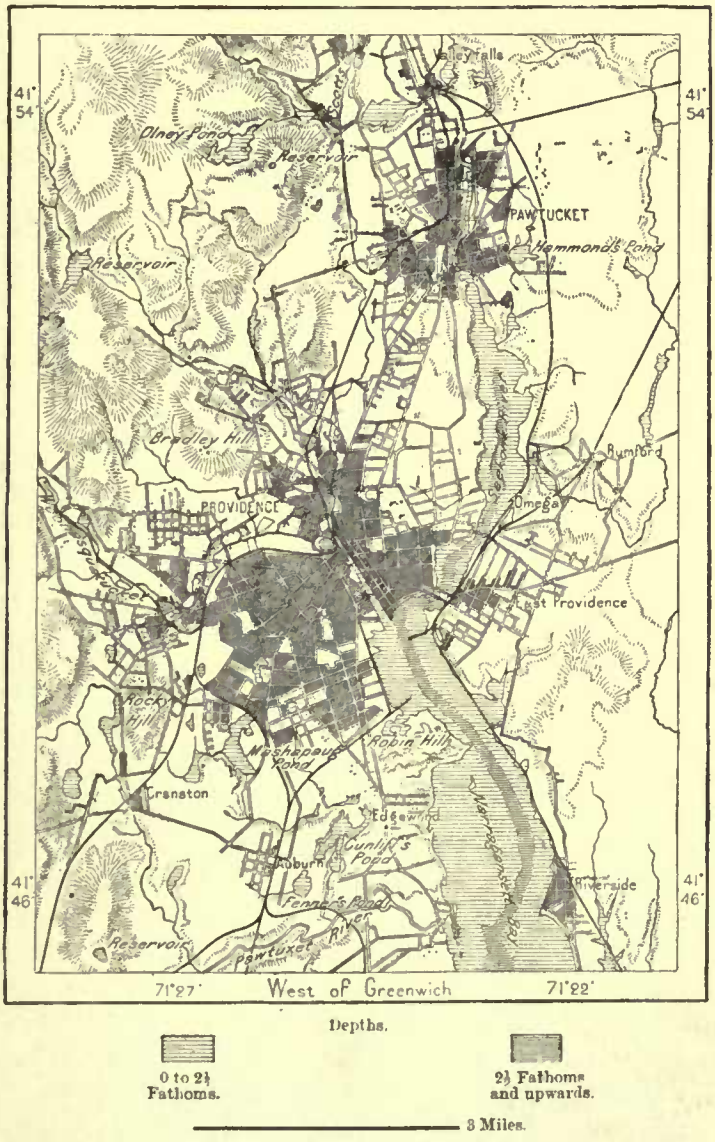
Rhode Island, "Little Rhody," the smallest state in the American Union, represents no more than the two hundred and thirteenth part of Texas, the largest. But in density of population and the relative value of its products, it takes the first rank. Belonging to the same physical region as Massachusetts and Connecticut, on its north and west frontiers, it presents the same general aspect, and yields the same produce everywhere, except in the south-east corner.

Here the seaboard is deeply indented by Narragansett Bay, which is studded with numerous islands; one of these, the Indian Aquidneck ("Floating on the Water"), received from the English settlers the name of Rhode Island, from the island on the coast of Asia Minor, and this name was afterwards extended to the state.

All the towns of Rhode Island are manufacturing centres. In this densely-peopled territory the land is too valuable to be utilised by the rudimentary system of tillage practised in most other states of the Union, and the greater part of the inhabitants are occupied with gardening, or more especially with manufactures.

The Blackstone, a small Massachusetts stream penetrating into the eastern part of the state, also supplies driving power to the workshops of *Woodsocket Falls*, and farther on to those of other towns and villages as far as *Pawtucket* and *Providence*, one of the two capitals of the state. At Pawtucket, which has already been almost absorbed in its ever-growing neighbour, was established the first

Fig. 49.—PROVIDENCE.
Scale 1 : 140,000.



cotton-mill in the United States in the year 1790; for half a century it enjoyed the industrial supremacy, and even still possesses the most important spinning factory in the whole Union. No watercourse, not even the Merrimac, is turned to better account as a motive power than the Blackstone, whose specialties are cottons and woollens. This narrow valley is inhabited by about half a million

Anglo-Americans, Irish, Franco-Canadians, and Swedes. Here it has a fall of nearly fifty feet, and from this point its lower course retains its old Indian name of Pawtucket, whence the town has been designated.

Providence, which even without its suburbs contains over one-third of the whole population of Rhode Island, and more than half if the environs be included, was originally founded by exiles. Roger Williams and five associates, having incurred the wrath of the stern Massachusetts' Puritans, for their unorthodox interpretation of Holy Writ, sought a refuge amongst the Narragansett Indians, and in the year 1636 formed a settlement at the point where the Blackstone expands into a broad estuary at the head of Narragansett Bay. Thanks to its favourable position at the head of the deep-sea navigation, and also to its liberal constitution, granting absolute freedom of worship to all citizens, the new colony soon attracted fresh settlers, and spread rapidly.

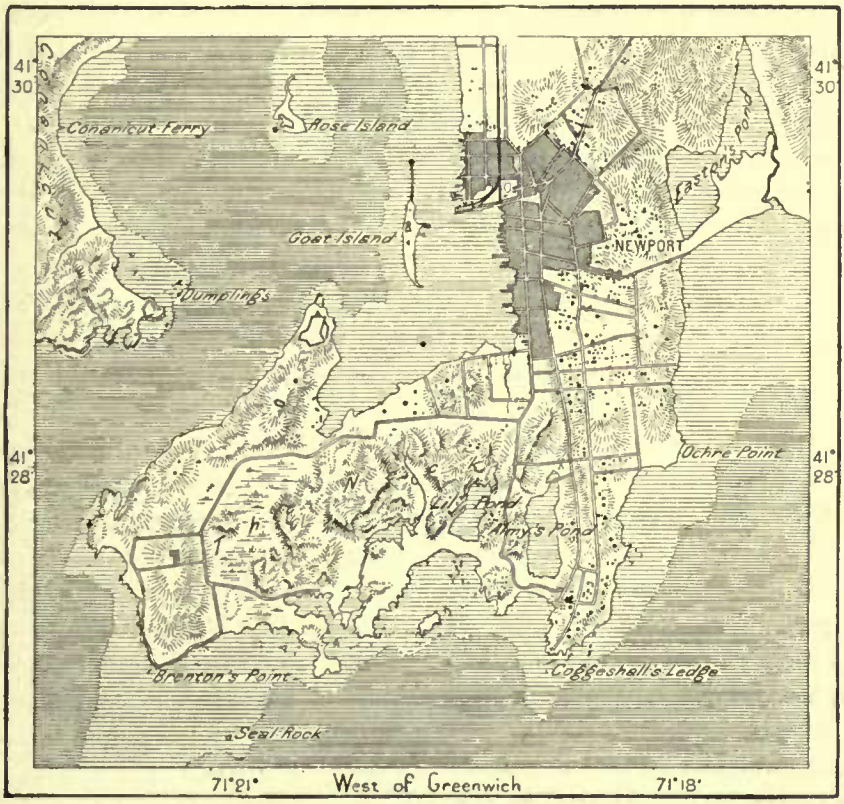
Unlike most American cities, Providence is not laid out with the regularity of a chess-board. The early country roads and tracks have become the chief thoroughfares, and still bear the names of the cardinal virtues given to them by the pious founders of the settlement. It is now proposed to drain and fill up the "cove," or central basin of the harbour, round which the city has been developed, but which has almost become an open sewer.

This important industrial centre produces a great variety of wares—textiles, yarns, machinery, utensils of all kinds, and fine jewellery—and possesses choice art collections and libraries. It has the reputation of being the wealthiest city in the United States, regard being had to the population. Brown University, its chief educational establishment, is excelled in New England only by Harvard (Cambridge), and Yale (New Haven). The inhabitants of Providence have also their sacred rock, though perhaps less authentic than that of Plymouth, indicating the spot where the founder of the colony is supposed to have stood when he was welcomed by the local Narragansett chief, with the words, "What cheer?" The expression is now employed in a patriotic sense as a password to attest the excellence of everything appertaining to Rhode Island.

Newport, the second capital, occupies the southern extremity of the island from which the state takes its name, and which is now connected by a stone bridge with the mainland. Newport consists in reality of two towns, the old quarter occupied with trade and fishing, and the new city consisting exclusively of villas and private residences. Before the revolution it had a considerable trade, far exceeding that of New York. At present it is reduced to little more than a coasting traffic, and the numerous steamers frequenting the harbour carry far more holiday-makers than traders. The local regattas often attract hundreds of yachts from New York. The old town, defended by Fort Adams, had formerly great strategic importance as commanding the entrance both to Narragansett Bay and to Long Island Sound. Here is still a United States arsenal and a torpedo school. The new quarter, though with a smaller population, covers a far greater area, extending along the eastern and southern edge of the cliffs for a distance of at least three miles. It is the great summer resort of the merchant princes, and generally of the wealthiest

and most fashionable classes in North America. Newport "society" is distinctly the most exclusive "aristocratic circle" in the Union. The villas and mansions vie with each other in lavish display of opulence; all the avenues radiating round the casino are fringed with flower-gardens and shrubberies, and in the season crowded with brilliant equipages. In the public park stands the old "Stone Mill," a round tower with Roman arches resting on heavy pillars, which has become famous since Rafn and other archæologists mistook it for a monument built by the

Fig. 50.—Newport.
Scale 1 : 70,000.



Norsemen five centuries before the discovery of America. It is in fact a mill erected by the governor in the middle of the seventeenth century. Trinity Church, one of the oldest in the place, is associated with the memory of the famous Bishop Berkeley, philosopher and divine, who preached in its pulpit about the year 1730.

6.—Connecticut.

Connecticut, or the "Long River State," is bounded, like most other territorial divisions of the republic, by conventional straight lines everywhere except on

the south side, which is washed by the waters of Long Island Sound. In its relief and general geographical constitution the country consists of sections of parallel fluvial valleys descending seawards from Massachusetts, and separated by intervening ridges of low elevation.

Like most other New England states, Connecticut is a busy industrial region, the products of which are, however, less specialised than elsewhere. The inhabitants boast of being the most Yankee of Yankees, and the "Brother Jonathan" applied by the English jocularly to all Anglo-Americans, and especially to the New Englanders, has reference to Washington's intimate friend, Jonathan Trumbull, a citizen of Connecticut. In proportion to the population Connecticut has given birth to a greater number of celebrities than any other state; it also takes out more patents every year, and its inventors and craftsmen have had the largest share in developing industrial processes throughout the Union.

The cotton-spinning machines, the revolver, the method of preparing rubber, and many other mechanical appliances, attest the inventive faculty of these Yankees, who also take the first rank for the manufacture of the most approved sewing-machines. In fact, the Connecticut specialities comprise the innumerable so-called "Yankee notions," amongst which satirists do not forget to include the "wooden nutmegs," which have earned for it the title of the "Nutmeg State." It is also known as the "Freestone State," from the building material which it supplies in abundance to New York.

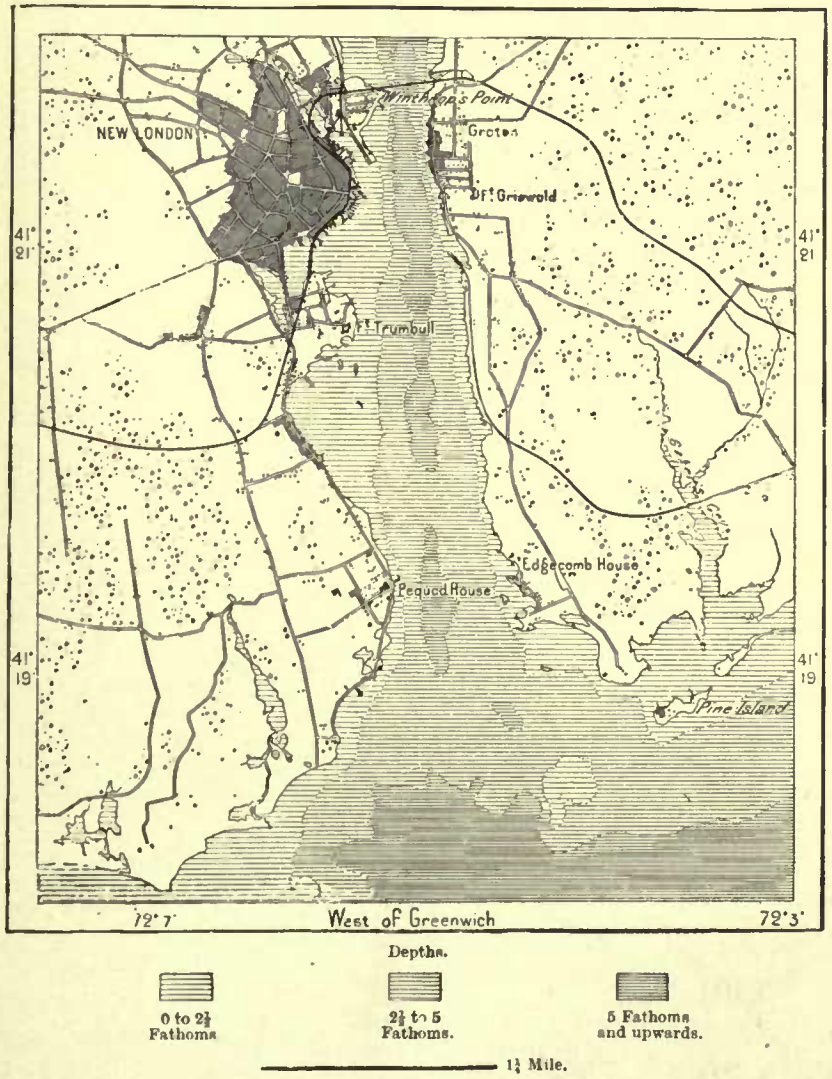
In the eastern part of the state the chief place is *Norwich*, at the confluence of two rivers, whose united waters form the Thames, and whose falls have largely contributed to the local prosperity. The pure waters of these streams are utilised especially for the manufacture of paper. Long an obscure village, noted only as the burial-place of chiefs of the Mohican tribe, Norwich rose somewhat suddenly to a position of considerable prosperity, whereas *New London*, situated on the rough rocky ground at the mouth of the river, has remained stationary, or even somewhat declined. Founded in 1646, and named in memory of "the dear native land of England," New London has the great advantage of possessing the largest, best-sheltered, and deepest harbour on this coast, in the estuary of the navigable river Thames, as it was named by the early English colonists. The loyalty of its founders, however, did not prevent New London from being burnt by the Royalist forces, led by the traitor Arnold, during the War of Independence. It recovered from this blow during the flourishing days of the whale fishery, of which it was a chief centre. But since the ruin of this industry in the Atlantic waters, the shipping of New London has mainly been confined to the neighbouring sea-coast.

The chief river valley which gives its name to the state is no less densely peopled in Connecticut than are its upper reaches within the Massachusetts frontier. Industrial towns follow in a continuous zone all the way to *Hartford*, the capital, which lies on the right bank of the river. The opposite side is occupied by an extensive suburb, while numerous villas are scattered in all directions over the neighbouring wooded heights. Even as an English settlement, Hartford is an older place than New London, dating from the year 1636; but some Dutch

pioneers had already founded a station on this spot, the site of the Indian village of *Suckeag*. Hartford, one of the most opulent cities in the Union, possesses a superb capitol in white marble, embellished with statues and bas-reliefs, and crowned with a glittering dome.

Formerly it boasted of perhaps a more interesting monument, the "Charter Oak," so named because here was hidden, in 1686, a copy of the charter granted

Fig. 51.—New London.
Scale 1 : 65.000.



by the king, but which one of the governors wanted to suppress. The tree, having been blown down by a cyclone, its site was indicated by a marble tablet, and Charter Oak, like What Cheer Rock, of Rhode Island, continues to be regarded as the palladium of the local liberties. Hartford vies in opulence with Providence, and is at present the chief centre of insurance associations in the United

States. Its libraries are also in a flourishing condition, but the chief industrial establishment is an extensive small-arms factory.

South of Hartford, *New Britain* in the valley of the Connecticut, and *Meriden* in the fluvial valley draining to New Haven, are both busy towns, the latter possessing the most extensive electro-plating factory in the Union. Here the itinerant Con-

Fig. 52.—New Haven.
Scale 1 : 80,000.

necticut traders, who visit every part of North America, supply themselves with the tinware, cutlery, silver-plated ware, britannia ware, bronzes, and the like, of which they have almost acquired a monopoly.

The village of *Saybrook*, on the left side of the Connecticut estuary, is the oldest English settlement in the state; but it never became a thriving seaport,

owing to the obstruction to navigation caused by the bar at the mouth of the river. The old fort which defended its entrance has been razed to the ground to make room for a railway-station. The school founded here in 1701 has also been removed to *New Haven*, and is now merged in the famous university of Yale College, whose charter dates from the same year, 1701.

Although deprived of the rank of capital, which, till recently, it shared with Hartford, New Haven is the largest city in the state, as well as its busiest trading place. The harbour is too shallow to admit large vessels, but it is supplemented by several other inlets, such as *West Haven*, *Fair Haven*, and *East Haven*, all of which trade chiefly with the West Indies.

New Haven has received from its inhabitants the title of the "Elm City," which is thoroughly justified, except for the industrial and shipping quarters, which resemble those of most other cities in the United States. The spacious squares are shaded by magnificent elms, which are clothed with foliage down to the very ground; and these superb avenues are continued by broad boulevards, where trees of the same species and of the same dimensions adorn the grassy swards, affording a grateful shade to numerous suburban villas with bay windows and verandas, clothed with ivy and surrounded by flower-gardens. Here everything is free and open, no barriers, no enclosures, no threatening notices to trespassers, nothing even to indicate the boundaries of private residences.

A whole quarter of the city is occupied by the scattered buildings of Yale College, which contends with Harvard and Johns Hopkins for the honour of ranking as the foremost educational establishment in the Union. It takes its name from a wealthy merchant, who at a critical point in its early career presented it with a gift of £500 sterling. The Puritan college, which has become one of the wealthiest institutions in the world, enjoys a yearly revenue of $300,000, and possesses numerous sumptuous buildings for its museums, libraries, class and assembly rooms, and chambers for its 120 professors and 1,300 students.

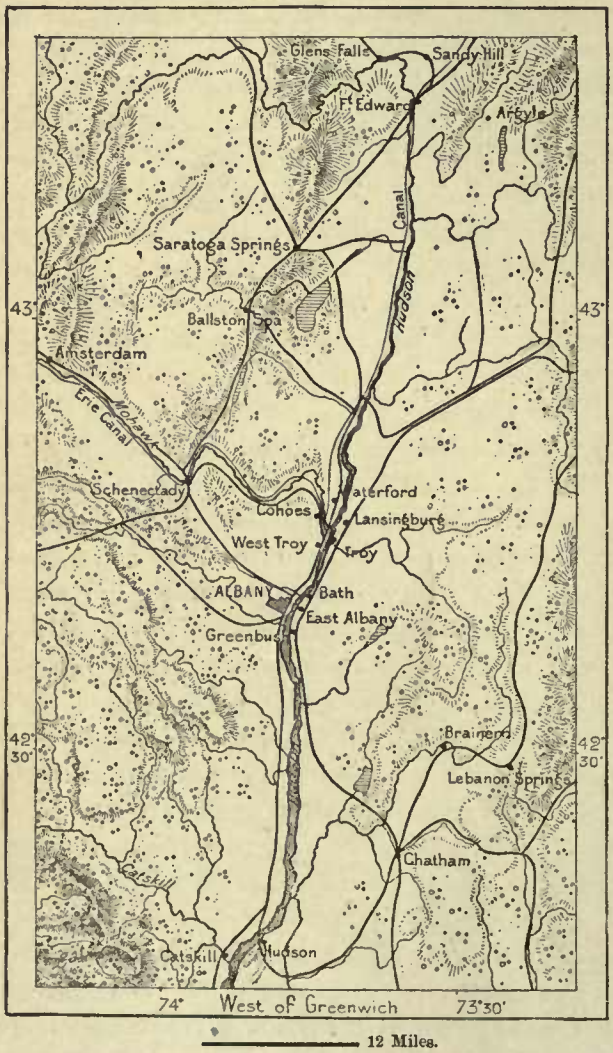
But the glory of Yale College is the Peabody Museum, containing a paleontological collection, where the geologist Marsh has brought together all the specimens of the remarkable extinct fauna recently discovered in the Rocky Mountains and Bad Lands of the Far West. Besides Yale College, New Haven possesses several other scholastic establishments, the most important of which is the Hopkins Grammar School, dating from the year 1660.

The western part of Connecticut is comprised almost entirely within the basin of the Housatonic, which also supplies abundant water-power to numerous industrial centres. Of these the most important is *Waterbury*, which stands on the Naugatuck affluent of the Housatonic and which boasts of one of the largest watch factories in the world. *Stratford*, the port of entry, is little more than an obscure village; but some flourishing places follow along the coast. Such are *Bridgeport*, a great centre for the manufacture of sewing-machines, fire-arms, carriages, hardware, and machinery; the twin towns of *Norfolk* and *South Norfolk*, and farther on *Stamford*, all noted more for their oyster-beds, and as watering-places, than for their industries.

7.—New York.

New York, the "Empire State," takes the foremost position in the Federal Union, both in respect of population and of commercial activity. Excluding Long Island, the conventional lines marking most of its frontiers have given it the form of a nearly regular triangle, with its apex, that is, the island of Manhattan, touching the Atlantic, and its base facing two of the Great Lakes and the river St. Lawrence. The ground dips both ways, on one side draining directly to the Atlantic, either through the Hudson, the Delaware, or the Susquehanna, on the other to the St. Lawrence basin either directly by streams flowing to the lake and river, or indirectly through Lake Champlain.

Fig 53.—Hudson-Mohawk Confluence.
Scale 1 : 963,000.



The two chief water-partings are the mountainous and lacustrine plateau of the Adirondacks, and the parallel chains of the Catskills. The surface of the land contains many fertile tracts, while the underground formations abound in ores and building materials. But the state owes its chief importance to the two great natural highways of commerce, that of the Hudson through Lake Champlain to the St. Lawrence, and that running from the Mohawk-Hudson confluence west to Lake Erie. Thus New York City is the necessary outlet for produce forwarded through the depressions from one slope to the other, and from this primary advantage have followed all the other privileges that have placed this state at the head of the North American Union. Of the sum total of the public wealth it contains a larger proportion than all the Southern states taken together.

At the time when the thirteen original colonies were first constituted a federal union, New York occupied only the fifth place in population, being surpassed in this respect by Virginia, Pennsylvania, North Carolina, and Massachusetts; but since 1820 it has taken the first position, although recently the difference between New York and Pennsylvania has diminished in favour of the latter state.

Fig. 54.—Lake George.

Of all the regions on the Atlantic slope the Empire State has preserved the greatest number of the aboriginal peoples. The survivors of the Six Nations (Iroquois) are still settled in the basin of the elongated lakes draining to Lake Ontario through the Oswego River, while another reserve lies on the Canadian frontier. In 1890 these tribal groups numbered collectively over 5,300.

The large towns are distributed along the natural highways by which the state is intersected, the chief urban groups being centred in the longitudinal zone connecting the St. Lawrence with the Hudson estuary. Here are situated Albany and neighbouring towns, and at the southern extremity New York City itself.

In the triangular space described by the Upper Hudson with its Mohawk affluent, the most frequented summer retreat is the borough of *Saratoga Springs*, where during the season as many as 50,000 visitors find accommodation in the hotels here erected on a scale of prodigious size. As many as 28 mineral springs, saline, sulphurous, iodurettted, or carbonate, are grouped near a little lake which bore the Indian name of *Saraghoga*, whence the Anglo-American "Saratoga." In 1535 Jacques Cartier heard reports of the marvellous virtues of these waters, and the first white man guided to the spot by friendly Indians in the year 1767 was completely cured.

Although the district is neither picturesque nor fertile, fashion expects the moneyed aristocracy to make a lavish display of wealth at this place. The races on the track owned by the Saratoga Racing Association are the most famous in North America, and not a season passes but some important political, scientific, or other gathering assembles in one of the palatial hotels, some of which are large enough to entertain as many as a thousand visitors.

A fine avenue of trees some six miles long connects Saratoga with *Ballston Spa*, another noted watering-place. Saratoga Lake, which lies about five miles north-east of Saratoga Springs, is nearly seven miles long and two miles broad, and here are held several regattas during the season. It drains through Fish Creek to the Hudson. Some twelve miles east of the Springs is the spot where the British general, Burgoyne, surrendered to General Gates in the year 1777.

The confluence of the Hudson with the Mohawk is marked by a pleiad of cities, which in reality form a single urban aggregate with a collective population of about 200,000 souls. *Amsterdam*, westernmost of these groups, still bears the name given to it by its Dutch founders; like its neighbour *Schenectady*, *i.e.* "Beyond the Pines," it is noted for its butter, its hops, and especially its brooms. Schenectady is the seat of Union College.

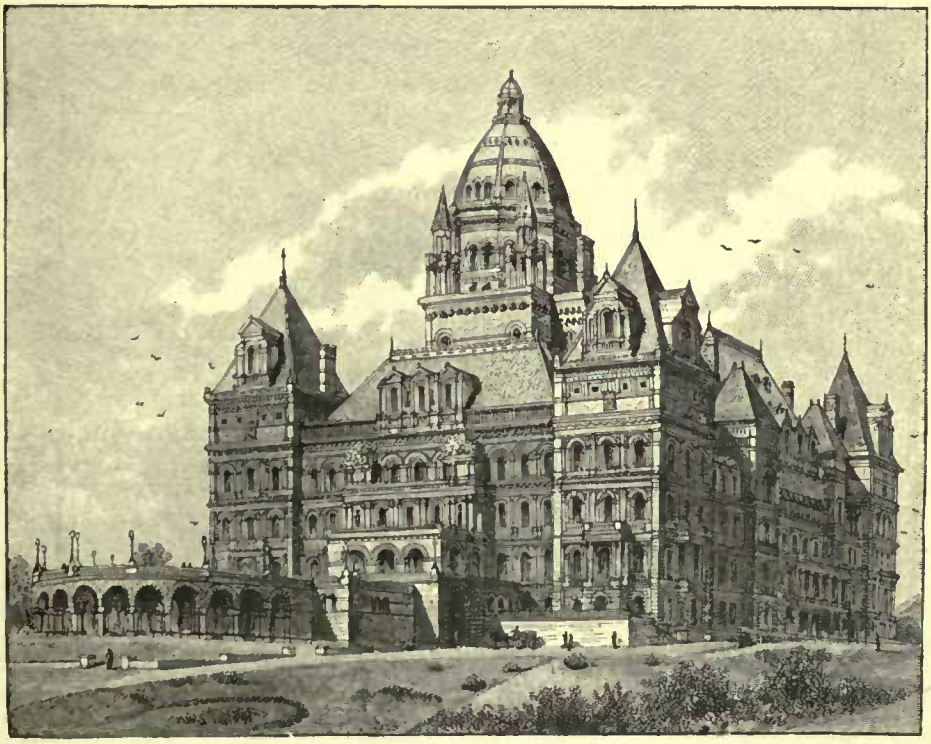
Cohoes, sometimes spoken of as the "Manchester of New York," is a manufacturing place, producing paper, cotton, and woollen goods. At this spot the Mohawk tumbles into the Hudson over a fall which supplies the motive power to the local mills. South of the confluence the united stream is skirted on both sides by a continuous succession of riverine towns, for a distance of about 12 miles. *Waterford* stands on the peninsula formed by the two converging rivers over against *Lansingburg*, with its countless villas embowered in shady vegetation.

Lansingburg, which is connected with Waterford by a bridge across the Hudson, is continued along the left bank by the populous city of *Troy*, which, like the ancient city of the Troad, has its Olympus and Ida, modest little eminences quarried for their building stone. Troy, which marks the head of the steamboat navigation 6 miles above Albany, has numerous iron, Bessemer steel, cotton, carriage, and other works. It is connected by two bridges with *West Troy*, which is disposed in amphitheatrical form on the opposite side of the river.

Lower down on the east side follow *Bath* and *East Albany* or *Greenbush*, both suburbs of *Albany*, proud capital of the empire state. Here the Hudson is crossed by three bridges connecting this place with its eastern suburbs.

Albany is the oldest European settlement in the Northern States; its site had already been explored in the year 1609, and five years later a Dutch factory was founded on the river-bank. Then in 1625 the Dutch erected *Fort Orange*, which after the conquest (1664), the English renamed Albany, in honour of the Duke of York and Albany, afterwards James II. The state house, built in 1667, is the oldest public edifice in Albany, which, however, still contains several Dutch houses with their quaint gables. There are numerous museums, valuable collections,

Fig. 55.—The New Capitol at Albany.



educational establishments, and a splendid public park. But the chief monument is the Capitol, or State House, a sumptuous granite pile, which cost over $20,000,000; it is one of the grandest structures of the kind in the world, and in the United States is exceeded in size only by the Federal Capitol at Washington, and the Philadelphia city hall.

Albany takes a leading part in directing political opinion in North America, a position which it may be said to have assumed so early as 1754, when a congress assembled here to deliberate on a union of the provinces on a basis afterwards adopted in some essential features by the Federal Constitution.

As a commercial and industrial centre Albany possesses all the advantages derived from the Hudson, and the navigable Erie canal, which runs westwards

from this place, and which in 1889 was navigated by boats representing over 5,370,000 total tonnage. Enormous masses of lumber are piled up along the quays, and the chief local manufactures are hardware, paper, pianos, machinery, and beer. But the great government arsenal of *Watervliet* is situated higher up the river at West Troy.

Hudson, on the left bank 28 miles south of Albany, marks the head of the deep-sea navigation. Here the famous navigator, who gives his name to the river, was compelled to cast anchor, his further progress being arrested by the shoals and sandbanks higher up. During the last century the trade of this place was at least equal to that of New York; it possessed a considerable mercantile fleet

Fig. 56.—The Catskills.
Scale 1 : 750,000.

largely engaged in the whale fisheries. The Catskill Mountains on the opposite side are studded with hotels frequented during the season by over 100,000 visitors.

Poughkeepsie, the ancient *Apokipsink*, or "Safe Haven" of the Mohawk Indians, has become a considerable place, the largest city between Albany and New York, thanks to its position midway between those two great industrial hives. Its wharves are crowded with steamers and other river craft, and Poughkeepsie has also acquired exceptional importance as one of the chief stations on the main route between Pennsylvania and Massachusetts.

Standing on a terrace some 150 feet above the left margin of the river, Poughkeepsie is itself dominated by the public park and the vast structure of Vassar

College, the wealthiest and largest female educational establishment in the Union. The central block is a huge pile 500 feet long and five stories high. Poughkeepsie is also the seat of the Hudson River State Hospital for Insane, another vast and imposing group of buildings two miles north of the city proper.

Newburgh, below Poughkeepsie but on the opposite side of the Hudson, is one of the historical cities of the Union. Here Washington disbanded the federal forces after the struggle for political independence had been brought to a successful issue. The eminence which commands the river south of Newburgh and *Fishkill* is crowned by the buildings of the *West Point* Military Academy, founded in 1802. All the officers of the Federal army receive their education at this establishment, which occupies one of the finest sites in America, amid surroundings calculated to leave a lasting impression on the minds of the young men adopting the military career in the service of their country.

South of West Point the Hudson, escaping from the gorges of the highlands, expands into the spacious Tappan Sea, which is overlooked on the east side by the extensive buildings of the Sing Sing state prison. The central structure is a huge limestone block nearly 500 feet long and five stories high; here some of the convicts are employed in the mechanical arts. Beyond Sing Sing the river again contracts at the foot of the Palisades, where the crests and slopes of the hills are studded with villas. Opposite the Palisades is the city of *Yonkers*, which, although 15 miles from the Grand Central Depôt of New York, already threatens to be absorbed in the rapidly expanding Empire City.

Nieuwe Amsterdam dates from the same year, 1614, as the fort at Albany, that is, five years after the exploration of the river by Hudson. A fortified post with four little houses built at the southern extremity of Manhattan Island, between the two estuaries of the North and East Rivers, were the first humble beginnings of the empire city, which with its suburbs already rivals Paris, and is surpassed by London alone amongst the great cities of the world.

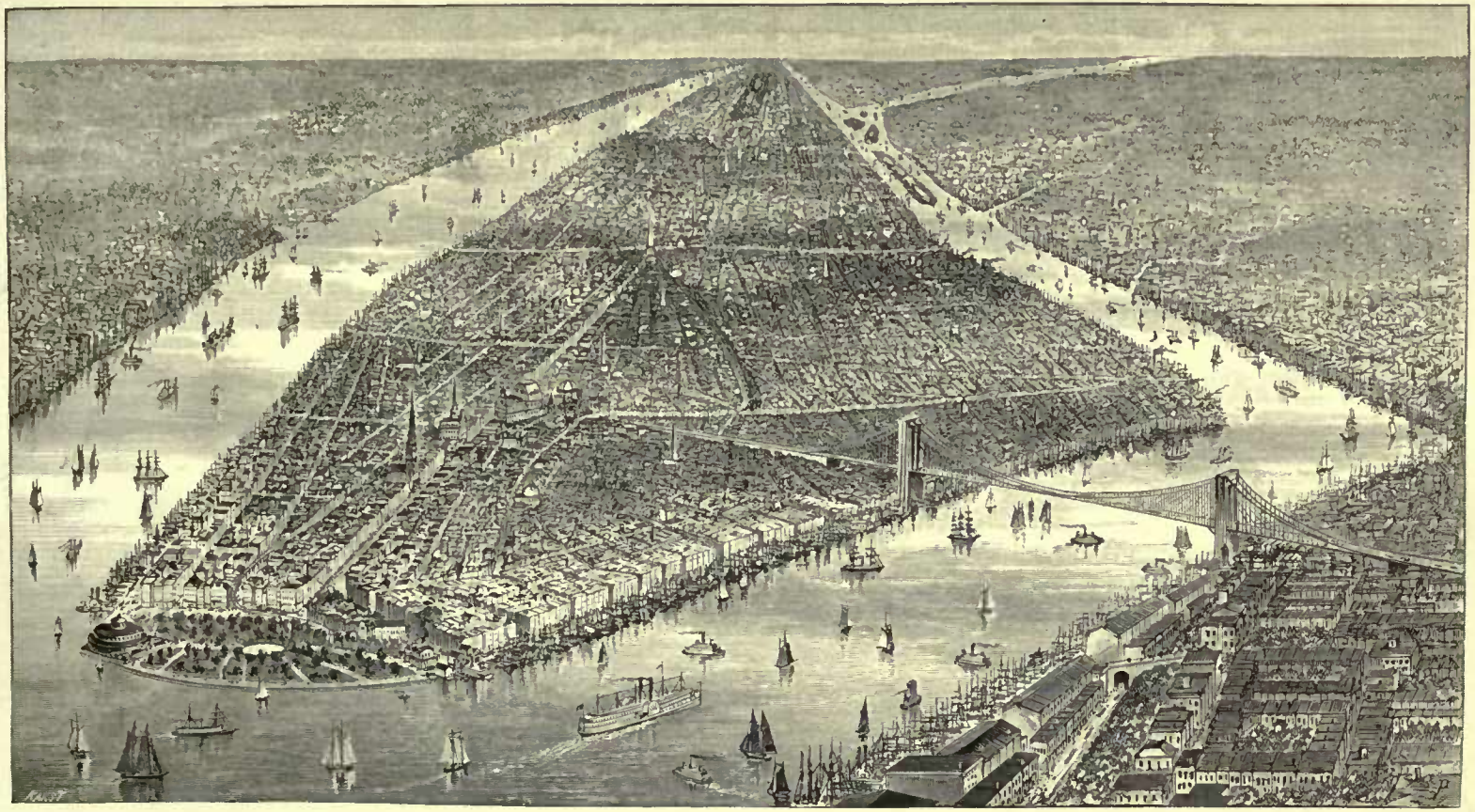
Twenty years after the foundation the little Dutch settlement raised a rampart from shore to shore against the neighbouring aborigines along the line still indicated by "Wall Street," which has now become the financial centre of the New World. At first the settlement grew so slowly, that in 1664, when it was conquered by the English, and changed its name to *New York*, it had a population of only 2,000 souls. But these have left numerous descendants, to whom is popularly applied the term "Knickerbockers," after Diedrich Knickerbocker, one of Washington Irving's characters, taken as typical of the Dutchman of the period.

The present city of New York, properly so called, pent up in its narrow island, which has a mean width of scarcely two and a half miles between the Hudson and the branch of the sea known as the East River, and higher up as the Harlem River, has been compelled to develop itself longitudinally in the direction from south to north. Beyond the labyrinth of irregular streets in the lower town, the regular blocks, separated by parallel streets, follow from First to Hundredth Street in unbroken succession. At Two-hundred-and-twentieth, here, however, not yet completely built over, they stretch beyond the

low-lying southern tracts, and, after absorbing the central granite formations, they have crossed the Harlem River, and encroached on the mainland as far as the Bronx River, which runs southwards through Westchester County and enters Long Island Sound above the Harlem branch.

Fig. 57.—Successive Growth of New York.
Scale 1 : 200,000.

The lower course of the Bronx forms the official boundary of the city, which comprises a superficial area of 40 square miles, and includes several townships, such as *Mott Haven*, *North New York*, *Morrisania*, *Tremont*, *Fordham*, and others, that have been merged in the all-devouring metropolis.



GENERAL VIEW OF NEW YORK.

Still more extensive is the ground covered by the dependent cities. In the east especially, that is, in Long Island, where a far greater space was available along East River and New York Bay, the population has already covered an immense area. Here *Long Island City*, and farther south *Brooklyn*, a second New York, occupy a great part of the western extremity of Long Island, between the Atlantic and the strait of Hell Gate.

On the opposite side of the bay, several cities belonging politically to the State of New Jersey, but inseparably connected with the New York social and commercial system, stretch along the right bank of the Hudson estuary from the foot of the Palisades to the narrow channel flowing between the mainland and Staten Island. Such are *Weehawken*, *Hoboken*, and *Jersey City*, which are kept distinct only by vast railway stations with an enormous network of rails.

South of the Hudson estuary the low peninsula of *Bergen* separates New York Bay from Newark Bay, where converge the estuaries of the Hackensack and Passaic rivers. Here also have been founded rising cities, such as *Greenville* and *Bayonne*, the latter probably a corrupt form of the earlier appellation, *Pavonia*, given to the settlement by the Dutchman, Michael Pauw. In the same way the neighbouring channel west of Staten Island, Arthur Kill, may be a corruption of the name *Achter Kill*, the "Backwater," given originally to Newark Bay. Another channel or passage, the Kill van Kull, separates Bayonne from Staten Island, the periphery of which, fringed with villages and watering-places, belongs *de facto*, though not administratively, to the great city.

A legislative commission is now deliberating on the question of merging in a single municipality, of some 330 square miles, the cities of New York and Brooklyn, as well as the other townships and suburbs, which, within the limits of New York State, gravitate towards the commercial centre of Manhattan Island. Political difficulties would, however, still prevent the other towns situated in the state of New Jersey from being amalgamated with the future metropolis.

But even this limited project meets with great objections, especially on the part of Brooklyn, which is most reluctant to lose its corporate independence. The maladministration of New York, which has become a byword in the United States, is not of a nature to attract its neighbours.* By such a municipal union they could gain no advantage beyond the empty honour of belonging to the second largest city in the world.

At the same time the union exists, though not proclaimed by any formal legislative act. In 1891 the New York-Brooklyn-Jersey City agglomeration, with the dependencies as far as Staten Island and the banks of the Passaic, comprised a collective population of no less than 3,250,000. According to the census of 1890, the inhabitants of New York City alone numbered 1,513,000; but two months later a second enumeration, undertaken by the municipality to test the former, yielded an urban population of 1,700,000 souls.

New York presents the sharpest contrasts in its different quarters. The old part of the city, where have been erected some historic monuments, and several

* In 1889, the municipal debt of New York amounted to the enormous sum of $146,100,000.

vast modern structures, ten, fifteen, and even twenty stories high, is an intricate maze, crowded during the day with a throng of business people and their employees, but at night left to the care-takers of the commercial buildings, and to the wretched denizens of badly-kept houses, let out in tenements or furnished apartments. The muddy streets near the river also traverse unhealthy quarters with commonplace houses, sheds, depôts, and long lines of grimy docks or wharfs of irregular form, constructed without any general plan.

Broadway, one of the main thoroughfares, runs from the lower town at first obliquely across the chessboard of quadrangular blocks, then north-east in a line with the main axis of Manhattan Island. This is the great artery of the commercial quarters, but at Madison Square, a shady public park of about six acres in extent, Broadway is crossed by Fifth Avenue, another great thoroughfare, which runs in a straight line for a distance of six miles towards the northern limits of the metropolis. This boulevard has been specially chosen by the wealthy merchants for their sumptuous marble, granite, or brownstone residences, some embellished with statues and reliefs, some with floral decorations of orchids and other rare plants. While so many other streets have been almost transformed to half underground galleries by the elevated railways, Fifth Avenue admitted till recently nothing but elegant private equipages. Nevertheless, even this thoroughfare, hitherto so jealously preserved, is being gradually encroached upon by shops and business offices; thus the private mansions are slowly yielding in the direction from south to north, to hotels, restaurants, and stores of all sorts.

Amongst the edifices there are some really beautiful structures, and certain arteries, amongst others Madison Avenue, present an aspect which is absolutely satisfactory to the eye. Here every imaginable architectural style, European and Eastern, classical and modern, Roman and Gothic, Renaissance and Persian, has been imitated, sometimes with complete success.

The finest and one of the largest edifices in New York is the Roman Catholic Cathedral of Saint Patrick, built entirely of white marble. Over a thousand other churches have been erected in New York and Brooklyn. In fact, the latter place has been specially named the "City of the Churches," a title, however, which might equally well apply to all the cities of the North-East, where one church to a thousand inhabitants is by no means an unusual proportion.

The time is approaching when the centre of New York will be occupied in reality, as well as nominally, by the "Central Park," a long quadrilateral of grassy slopes, woods, rocks, ornamental waters, and carriage drives, which has been skilfully laid out in an unoccupied space between the parallel north and south avenues. It covers a superficial area of no less than 840 acres, and the visitor might here easily fancy himself in the heart of the country but for the confused roar of the traffic in the surrounding streets. Here is the terminal outlet of the magnificent aqueduct which taps the Croton River at a point 40 miles north of the city, and feeds a number of vast artificial reservoirs capable of holding a supply of 1,211,000,000 gallons.

BROOKLYN BRIDGE, SEEN FROM NEW YORK.

The dykes, dams, lakes, conduits, and all the other works connected with this undertaking are on a colossal scale, and the underground section of the aqueduct is no less than 28 miles long. The Croton water is carried over the Harlem River between the city and the mainland by a magnificent bridge, and a tunnel containing another conduit has been excavated in the rocky bed beneath the same river. But by an unfortunate oversight the upper reservoirs were not legally protected from the encroachments of industrial works, and the water of the aqueduct is already being polluted by numerous factories.*

New York and Brooklyn are amongst the cities of the world which are best supplied with easy and rapid means of communication. Along some of the chief avenues, disposed in New York from south to north, and in Brooklyn from west to east, the so-called elevated railways, supported on iron colonnades above the roadway, keep up a constant service of trains running every few minutes to and fro between the suburban districts and the commercial quarters near the harbour.

On the water steam ferries of enormous size, which at night look like illuminated floating pyramids, keep up the communication from shore to shore. But owing to its insular position New York lacks some of the facilities enjoyed by other American cities for communication with the interior of the continent. It possesses only one central terminus provided with totally insufficient rails, and communicating with the mainland north of Harlem River only by a single drawbridge, which is open for several hours for the passage of shipping. The other great terminal stations are situated beyond New York proper on the right bank of the Hudson in Hoboken and Jersey City.

Several bridges connect Manhattan Island with the mainland across the narrow northern channel of Harlem River. But the marine branches near the harbour are still crossed only by one viaduct, the colossal suspension bridge thrown across the East River between New York and Brooklyn by the engineer Roebling. This gigantic work, the construction of which occupied thirteen years, from 1870 to 1883, rests on two piers, with an enormous central span of 1,595 feet. The two piers, springing from the caissons below the muddy bed of the East River, rise 272 feet above the high water. Vessels with masts 130 feet above the water level are able to pass under the bridge, which with the approaches has a total length of 5,989 feet. Wire cables of enormous strength support a platform with a footpath, two sideways for wheeled traffic, and a double line of rails for a railway, which is worked by a stationary engine, and which runs trains carrying about 100,000 passengers per day.

It is proposed to construct a similar bridge farther north across the same marine channel, and the engineers are discussing the plans of a stupendous suspension bridge over the Hudson River with a span of 2,870 feet. By the application of the cantilever principle, as carried out in the Forth Bridge at Edinburgh, such a viaduct seems perfectly feasible. Since 1874 a railway tunnel under the harbur between New York and Jersey City has also been in progress, though the works in the neighbourhood of the east side were suspended in 1891.

* Total capacity of the Croton reservoirs in the year 1891, 250,000,000 cubic feet daily.

At this section the rocky ground was found to approach so near the surface of the Hudson estuary that it would have to be pierced right through at a cost that has alarmed the projectors. But there can be no reasonable doubt that before many years Manhattan Island will be connected both with Long Island and the New Jersey mainland by overground or underground lines of communication amply sufficient for the growing requirements of the largest emporium in the New World.

Being primarily a commercial mart, New York is certainly inferior to Boston as a centre of science and the arts. Nevertheless, it possesses some extensive educational establishments, such as Columbia College, one of the foremost universities in the Union, and Stevens' Institute, on the New Jersey side, where the course of studies corresponds with that of the French *École Polytechnique*. The various libraries, especially the Astor and Lenox, contain valuable works connected with the history of America. The Metropolitan Museum of Art, a fine substantial structure in Central Park, but already too small for its accumulating treasures, is extremely rich in modern paintings, especially of the French school; here is also the famous collection of Cypriote antiquities purchased from Cesnola. Not far from the museum stands an Egyptian obelisk, of the age of Thothmes III., one of the two "needles" removed by Queen Cleopatra from the Temple of Heliopolis to her residence in Alexandria. The other, which lay for ages half buried in the sands on the beach near Alexandria, had already been transported to London and set up on the Thames Embankment.

More comprehensive in its general scope than the Metropolitan Museum of Art is the neighbouring American Museum of Natural History, which has been founded on a plan of great magnitude, and which admits of almost indefinite expansion, thanks to the wise foresight by which a considerable extent of waste land has been secured in the vicinity of Central Park. Here the administration has already erected a large group of substantial buildings, in which are conveniently displayed numerous archæological, ethnological, and other specimens from every part of the American continent. The institution, which is well endowed, is especially rich in pre-historic remains, pottery, objects in obsidian and jade or jadite from the mounds of the Mississippi basin, from Mexico, Peru, and Alaska. The collections, which are steadily accumulating, already rival those of Harvard and Washington in extent and variety.

New York harbour is a vast basin some 40 square miles in extent, continued northwards by the two estuaries of the North (Hudson) and East Rivers. It also communicates through the somewhat shallow Kill van Kull Channel westwards with Newark Bay, which, however, is accessible only to vessels of light draught, and which is traversed near the entrance by a railway viaduct $1\frac{3}{4}$ mile long. The northern part of New York Bay is studded with numerous islands, such as *Governor's Island*, where formerly resided the governor of the Dutch settlement; *Ellis Island*, where has been erected a vast structure for the reception of immigrants, of whom as many as 10,000 are here often assembled; *Bedloe's Island*, with some military works now reduced to a simple rampart at the

base of the pedestal surmounted by the colossal bronze statue of "Liberty Enlightening the World," a powerful work by the sculptor Bartholdi, presented to the American nation by the French people.

The chief drawback to New York Bay, otherwise one of the finest havens in the world, are the bar and shoals north of Sandy Hook, at the entrance to the vast roadstead of the Lower Bay, which is continued westwards by Raritan Bay to the ports of Perth Amboy and South Amboy. The Lower Bay presents as much accommodation for shipping as the inner harbour, with which it is connected by a deep channel called "The Narrows," about a mile in width and length, but the entrance to the magnificent roadstead and the estuary of the Hudson River is not naturally deep enough to admit the largest vessels. Constant dredging operations are even required to maintain a depth of 28 or 30 feet at low water. The channel sweeps round almost at a right angle west of Sandy Hook, abruptly rounding this sand spit to reach the open sea. Another channel runs from the Narrows directly to the Atlantic, but is unfortunately still shallower, admitting only comparatively small craft.

However, the Narrows are not the only entrance to the Upper New York Bay. Long Island Sound, contracted at its western extremity by a labyrinth of islands and peninsulas, terminates in a tortuous passage, whose junction with the Harlem River forms the East River leading between Manhattan Island and Brooklyn south to New York Bay. Hell Gate, as the passage is called, from the dangerous eddies and gneiss reefs on which hundreds of vessels have been wrecked, is now much more open and safer than formerly. Several of the rocks have been blown up by means of explosives deposited in submarine galleries, one of which was supported by as many as 172 pillars. The explosion of the chief mine, when a charge of 2,480 cwts. of powder and dynamite was fired by electricity, directed by the hand of a child, was awaited with no little anxiety by the citizens of New York. But no accident followed when a prodigious column of water, displacing at least 7,000,000 cubic feet of shattered rock, rose to a height of 300 feet, and then subsided harmlessly in the channel. But the work is still incomplete, and Hell Gate passage, being only at the utmost 26 feet deep, is still too shallow to admit the great Atlantic liners.

In the port of New York alone is concentrated more than half of the foreign trade of the United States, the total exchanges amounting in 1891 to over $800,000,000. Thanks to this enormous commercial development this emporium has become the most important city in the Union. As Russia faces westwards, the United States looks across the Atlantic eastwards to Europe, so that the two chief cities of both of these great powers occupy a somewhat analogous position as the "windows," so to say, of their respective domains.

Two-thirds of the imports and nearly half of the exports of the republic pass through the great American seaport. The unrivalled commercial highway running westwards through the Hudson Valley, the navigable Erie Canal and the Great Lakes, constitutes New York the general distributor of merchandise throughout the northern continent. A great part of the imported raw materials is

utilised on the spot in the factories of all kinds possessed by this vast hive of the industries. Moreover, the stream of emigration sets almost exclusively towards the port of New York, and most of the great Atlantic steamship companies have their western terminus in Manhattan Island. In 1890 these companies transported 470,000 passengers from the Old to the New World. As many as nine Atlantic liners have left the wharfs of New York in a single day for Europe.

But this vast traffic is carried on almost entirely by foreign vessels, and the American flag is one of those that are most conspicuous by their absence in the part of the harbour reserved for foreign trade. In 1890 more than half of this trade (51·5 per cent.) was conducted in British bottoms, the share of the United States not exceeding 15 per cent.

On the other hand, the traffic with the interior of the continent by the Hudson artery is reserved entirely to the American flag. So extensive is this movement that, taken in connection with the sea-borne traffic, it gives to New York the first place amongst the ports of the whole world. In this respect neither London with its Thames nor Liverpool with its Mersey can compare with the Hudson estuary, whose shipping represented in 1890 a total burden of nearly 31,000,000 tons, of which 12,000,000 tons were marine, and 18,582,000 fluvial navigation between New York and Albany.

Besides Central Park numerous public pleasure-grounds encircle the city. *Riverside Park*, in Manhattan Island itself, where the remains of General Grant have found a resting-place, affords from the summit of an eminence a fine view of the Hudson and the Palisades. Near Bronx a vast stretch of woodlands, lakes and rocks has been reserved as a public park; Pelham Bay Park skirts the shores of Long Island Sound, while Prospect Park is the glory of Brooklyn. The cemeteries, especially Woodlawn on the mainland and Greenwood in Long Island (Brooklyn), are also beautifully laid out with verdant slopes, ornamental waters, and shady avenues winding along the flanks of the hills.

But the most frequented of all pleasure resorts, visited on Sundays and holidays by tens of thousands from New York and Brooklyn, is *Coney Island*, a crescent-shaped strip of fine sands, separated only by a sluggish backwater from the south-west extremity of Long Island. The hotels of Coney Island and of the neighbouring *Rockaway* line the beaches for miles, and are all connected by railways with Brooklyn.

Another favourite watering-place is *New Rochelle*, a town of French origin, founded by some Huguenot refugees at the end of the seventeenth century, on the north side of Long Island Sound near *Mamaroneck* in Westchester County; down to the period of the War of Independence the parish registers of this place were kept in the French language.

The Hudson highway, a main source of the prosperity of New York, is supplemented by that of the Mohawk valley disposed east and west in the direction of Lake Erie. The lacustrine port of *Buffalo*, so called from the herds of "bisons" that formerly grazed on the surrounding solitudes now covered with human habitations, stands at the western extremity of the navigable canal

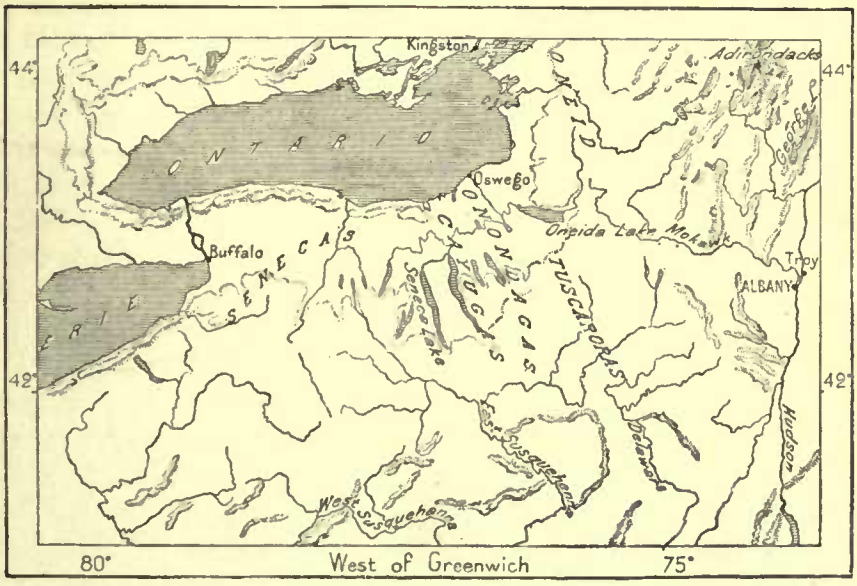
Above Rochester in the Genesee valley one of the richest salt regions in the Union has been recently developed. Its centre is at *Warsaw* in Wyoming county. The brine wells range in depth from 800 to 2,300 feet. The annual salt product of the Warsaw district is already 6,000,000 bushels.

The lacustrine region formerly comprised in the domain of the Six Nations is studded with populous towns, which have taken the place of the Iroquois "long cabins," while the Iroquois themselves are now confined to narrow reserves. *Geneva*, like its Swiss namesake, lies at the lower extremity of a beautiful lake—Lake Seneca—which is about 33 miles long, with a mean breadth of about two miles, and a depth of no less than 530 feet.

Ithaca lies at the head of Lake Cayuga, also a romantic sheet of water about the same size as Seneca, and nearly 400 feet deep. The southern extremity of the

Fig. 59.—Lakes of the Iroquois before the Settlement of the Land.

Scale 1 : 5,600,000.



lake is commanded by the imposing buildings of the Cornell University, so named from its founder, by whom it has been richly endowed. It is open to both sexes, and has an attendance of nearly 600 students.

Syracuse, at the entrance of Onondaga Creek into Onondaga Lake, is a great centre of the salt industry, and also a flourishing trading-place and seat of a rich university. Formerly about half of the salt consumed in the United States came from the saline springs bordering the lake, which since the year 1795 have been the property of New York State; these productive springs still supply one-seventh of the whole consumption, though the yield fell from about 10,000,000 bushels in 1862 to less than 5,600,000 in 1888.

Farther east is Lake Oneida, so named from another of the Six Nations. Its shores are destitute of large towns; but the village of *Oneida*, founded on the

site of some Indian settlements, is noted as the residence of the "Perfectionists," a religious and social community founded at this place by J. H. Noyes in the year 1848. The few survivors of this delusion are little more than a trading society engaged in the production and sale of butter, fruits and vegetables.

Oswego, a port of Lake Ontario, some 30 miles north-west of Syracuse, stands at the mouth of the Oswego River, through which all the emissaries of the Iroquois or "Finger" lakes find their way to Lake Ontario. Oswego was an old French military station, which often changed hands during the frontier wars. It is now the most flourishing city of the Union on the shores of Ontario, and the construction of the Oswego Canal, which connects at Syracuse with the Erie Canal, has made its commodious harbour the chief port of entry for the grains and wines of Canada. The harbour is well sheltered by long and costly piers, and it is now proposed to make it the terminal basin for a great navigable canal running through the Mohawk and Hudson valleys to New York and admitting sea-going vessels to Ontario. The craft of all kinds engaged in its inland and foreign trade represented in 1890 a total burden of 1,375,000 tons. In its passage through the city the Oswego River has a total fall of 34 feet, affording great motive-power to the neighbouring iron-foundries, flour-mills, machine-shops, and a vast corn-starch factory employing many hundred hands.

Between Syracuse, central city of New York State, and the group of towns clustering round Albany, its capital, there are still two important industrial centres in the depression which formerly carried off the overflow of Lake Ontario. These are *Rome* and *Utica*, the latter of which is much frequented by tourists, being the chief starting-point for the famous Trenton Falls on a Mohawk affluent, for the northern Adirondack "Wilderness" and for the St. Lawrence.

Elmira and *Binghamton*, two other thriving industrial cities, are important stations on the direct railway between New York and Buffalo through the upper Susquehanna valley. In the vicinity of Elmira, which lies on the Chemung River, is the famous *Watkins' Glen*, at the southern extremity of Lake Seneca. This romantic gorge, which attracts crowds of visitors in the season, is considerably over two miles long, and at its upper end stands nearly 800 feet above the lake. Thus the stream has a tremendous incline, broken at several points by beautiful cascades, some of which have a fall of from 50 to 60 feet.

8.—New Jersey.

The State of New Jersey, wedged in between New York and Pennsylvania, between the "North" and the "South" rivers, that is, the Hudson and Delaware, is one of the smaller of the original thirteen, but also one of those that have the largest relative population. The three chief lines of railway connecting New York with Philadelphia pass right through the heart of its territory, and add to its wealth as a dependency of these two great commercial marts. Thanks also to a more liberal fiscal system than that of New York, New Jersey has become the official headquarters of numerous financial companies, whose offices are really situated on Manhattan Island.

The most populous places in the state are either simple suburbs of the neighbouring cities or else urban groups gravitating in their populations, trade, and industries towards New York and Philadelphia. Tens of thousands of the inhabitants of New Jersey reside there only during the night, their business interests leading them during the day to the great emporia beyond the Hudson and Delaware. New Jersey is also a natural dependency of these cities, as a common watering-place; crowds of their inhabitants swarm on its beaches during the bathing season.

Hence the fertile or fertilised lands of the state are in great measure cultivated by market gardeners, who forward their produce to the metropolitan depôts. Thousands of the New Jersey factories, also, send their products to New York and Philadelphia, and are mainly owned by the capitalists of those cities. Thus is explained the fact that the chief potteries and most flourishing silk factories all lie within the borders of this little state.

Hoboken and *Jersey City*, both on the right bank of the Hudson, opposite Manhattan Island, depend absolutely on New York, as do the extensive railway stations and depôts grouped together along the narrow shore at the foot of the Palisade range of hills. All these busy places are connected during the day by huge steam ferries continually plying to and fro on the Hudson estuary. The towns, however, of the Passaic Valley, being separated by vast marshy lagoons from the peninsula of Jersey City, form distinct urban groups.

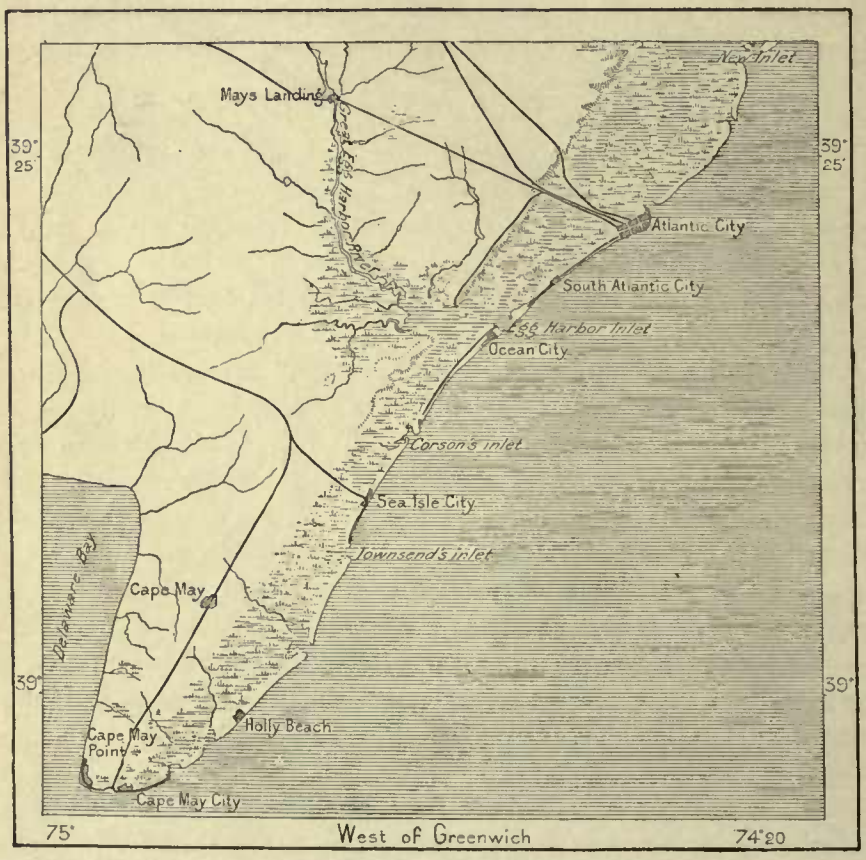
Newark, that is, the "New Ark of the Covenant," founded in the year 1666 by some Puritan settlers from Connecticut, has recently encroached on a part of these morasses; but the older quarters, as well as the fashionable new suburbs, all stand on the slopes of the hills, which represent the former coastline. Newark, the largest and most industrious city in New Jersey, has numerous rubber-works, coach-factories, breweries, silk and cotton spinning mills, although this latter branch of the manufacturing industries is more prominently represented in the towns of *Passaic* and *Paterson*, lying higher up the same river valley. Here a fall of about 50 feet supplies the equivalent of several hundred horse-power to the surrounding workshops. In the neighbourhood of Newark are some beautifully laid-out cemeteries, fine shady drives, and the delightful Llewellyn Park, covering the slopes of Orange Mountain.

While the New Jersey suburbs of New York are steadily advancing in the direction of the Newark flats, Newark itself is constantly encroaching north and west on the various quarters of *Orange*, collectively called "the Oranges," another busy place, whose staple industry is the manufacture of hats.

Elizabeth, famous for its sewing-machine factory, and *Rahway*, whose speciality is coachbuilding, communicate directly with New York Bay, and are dependencies of the great metropolis. *New Brunswick*, another industrial town, is similarly connected with New York, but it lies at the head of the navigation of the Raritan River, which discharges into the same bay as the Hudson, and within the bar at Sandy Hook. The two ports of *Perth Amboy* in the north, and *South Amboy* in the south, lie at the mouth of the Raritan, and do a considerable trade in earthenware and other products of the local industries.

Unlike Newark and the other towns of the same district, *Trenton*, capital of New Jersey, lies quite beyond the sphere of attraction of the Empire City. It gravitates rather in the direction of Philadelphia, being situated on the same river, the Delaware, at the head of the fluvial navigation, while steamers ply incessantly between the two places. Founded so early as the year 1680, Trenton grew very slowly till about the middle of the present century, despite the advantages of its position as capital of a state, and even as the temporary seat of the Federal Congress. Now, however, the great zones of attraction about New York and

Fig. 60.—Cape May.
Scale 1 : 650,000.



Philadelphia exercise an irresistible force on the intervening districts, and Trenton naturally benefits by its position as a central station between the two cities. On the ground at present covered by streets Washington gained in 1776 the important battle which restored the fortunes of the republic.

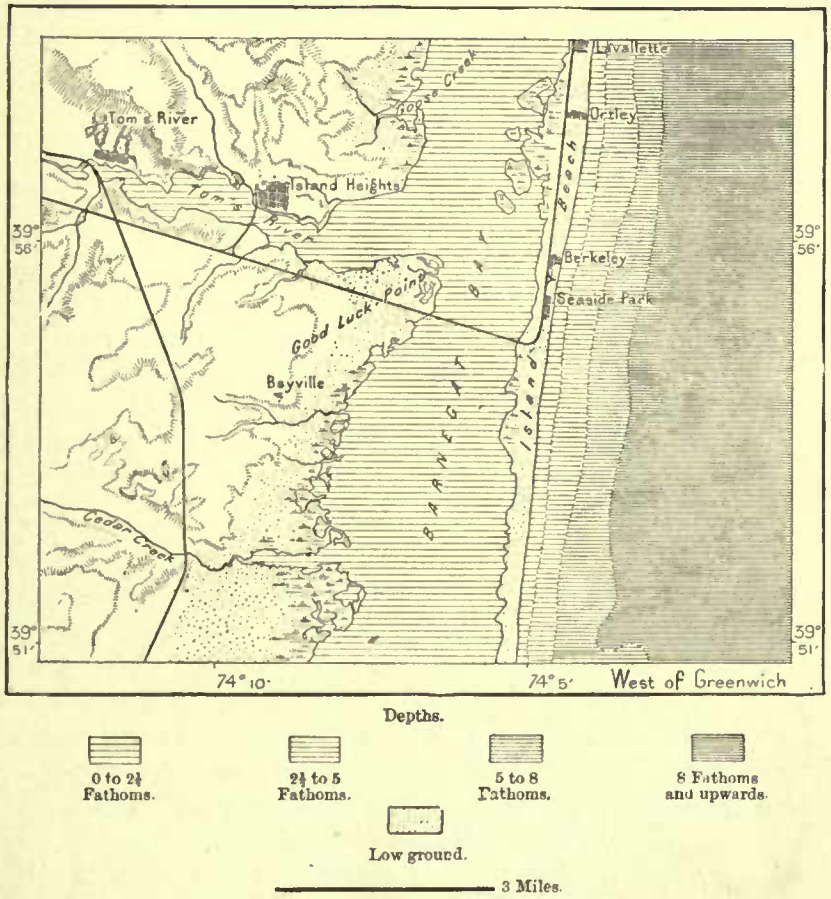
Trenton rests on a thick deposit of argillaceous clay, which supplies the material of its staple industry, crockery and earthenware, said to be the largest in America, and exported to every part of the Union. This "Trenton-ware" is of excellent quality, and deservedly enjoys a widespread reputation.

Princeton College, near the borough of *Princeton*, 10 miles north-east of

Trenton and 50 miles south-west of New York, ranks as the most important university in the state, and is in some respects a rival of Harvard and Yale. Of all the American universities, Princeton has given birth to the largest number of "daughters," that is, educational establishments founded by its *alumni* in various parts of the Union. The geographer, Arnold Guyot, first scientific explorer of the Appalachians, was long a member of its professorial staff. Princeton College was originally founded by the Presbyterian body at Elizabeth in 1746, but was removed ten years afterwards to its present site.

Most of the other noteworthy towns in New Jersey are watering-places

Fig. 61.—Barnegat Bay.
Scale 1 : 170,000.



situated on the seashore, and partly separated from *terra firma* by intervening morasses or running waters. They are much frequented by the inhabitants of the inland cities during the season, when as many as half a million visitors swarm on these strips of sand, which remain almost uninhabited during the winter months. Such are *Long Branch*, *Atlantic City*, and *Cape May*, the latter so named from the Dutch navigator, Carolis Jacobsen Mey, who coasted this seaboard in 1614. It lies near the southernmost point ("Cape May Point") of the state

between Delaware Bay and the ocean, while Long Branch, although in New Jersey territory, is as much a dependency of New York as Coney Island itself.

So popular has this place become that quite a permanent quarter, inhabited all the year round, has sprung up behind the marine esplanade. The rows of towns, villages, hotels, and villas extend a total distance of nearly 20 miles along the beach, and threaten one day to reach all the way to the breach in the shoreline through which the inner lagoon of Barnegat Bay communicates with the Atlantic. This inlet, which is one mile wide, gives access to boats between Island Beach and Long Beach, presenting a joint frontage of 22 miles.

Before the middle of the present century a few little groups of houses, lifeboat stations, and lighthouses were the only structures on Long Branch, which is now sometimes called the "summer capital" of the Union. At present the beach is lined by sea-walls and other works required to protect the palatial hotels and residences from the erosive action of the Atlantic billows.

9.—Pennsylvania.

This region had already been occupied by a few white colonists when William Penn, penetrating into its vast woodlands in 1681, named it Pennsylvania in memory of his father, Admiral Sir William Penn. The Swedes and Norwegians had founded the settlement of Christiania on the banks of the Delaware; the Dutch had established themselves on the spot where now stands New Castle, and some English Quakers were settled on the present peninsula of Philadelphia in the neighbourhood of a thriving Swedish colony at Wicaco. A year after the arrival of Penn a considerable number of Welsh people reached the country, and then followed the great immigration from Germany.

Pennsylvania is one of the most important of the thirteen original states as regards extent, geographical position, and natural resources. It fully deserves its popular name of the "Keystone State," not only for its massive rectangular form, with no natural frontiers except on the east side, but also because it contains within its territory the watershed between the Atlantic, the Gulf of Mexico, and the Great Lakes. Watered on the east and south-east by the Delaware and Susquehanna affluents of the ocean, it borders, if not on the sea, at least on a navigable estuary. Towards the north-west a narrow strip of its domain is washed by Lake Erie, while on the west and south-west it sends its running waters through the Ohio basin to the Mississippi and the Gulf of Mexico.

Thus Pennsylvania has three distinct slopes, and it was chiefly in the Appalachian regions of this state that were established the first easy lines of communication—roads and canals—between the various fluvial, lacustrine and oceanic basins. Thanks to this threefold natural division, Pennsylvania presents an astonishing variety of physical aspects and geological conformations, according as it faces the Atlantic seaboard with its Appalachian mountains and valleys, or the western lands sloping either to Lake Erie or to the Ohio basin.

Yet for population, accumulated wealth and even industry, Pennsylvania takes only the second rank. But although outstripped in these respects by New York,

it far exceeds the average when compared with the rest of the Union, containing as it does a twelfth part of all the inhabitants of the United States. The yearly value of the output of its coalfields, oil springs and iron industry exceeds that of all the other states, the products of its iron and steel works, in fact,

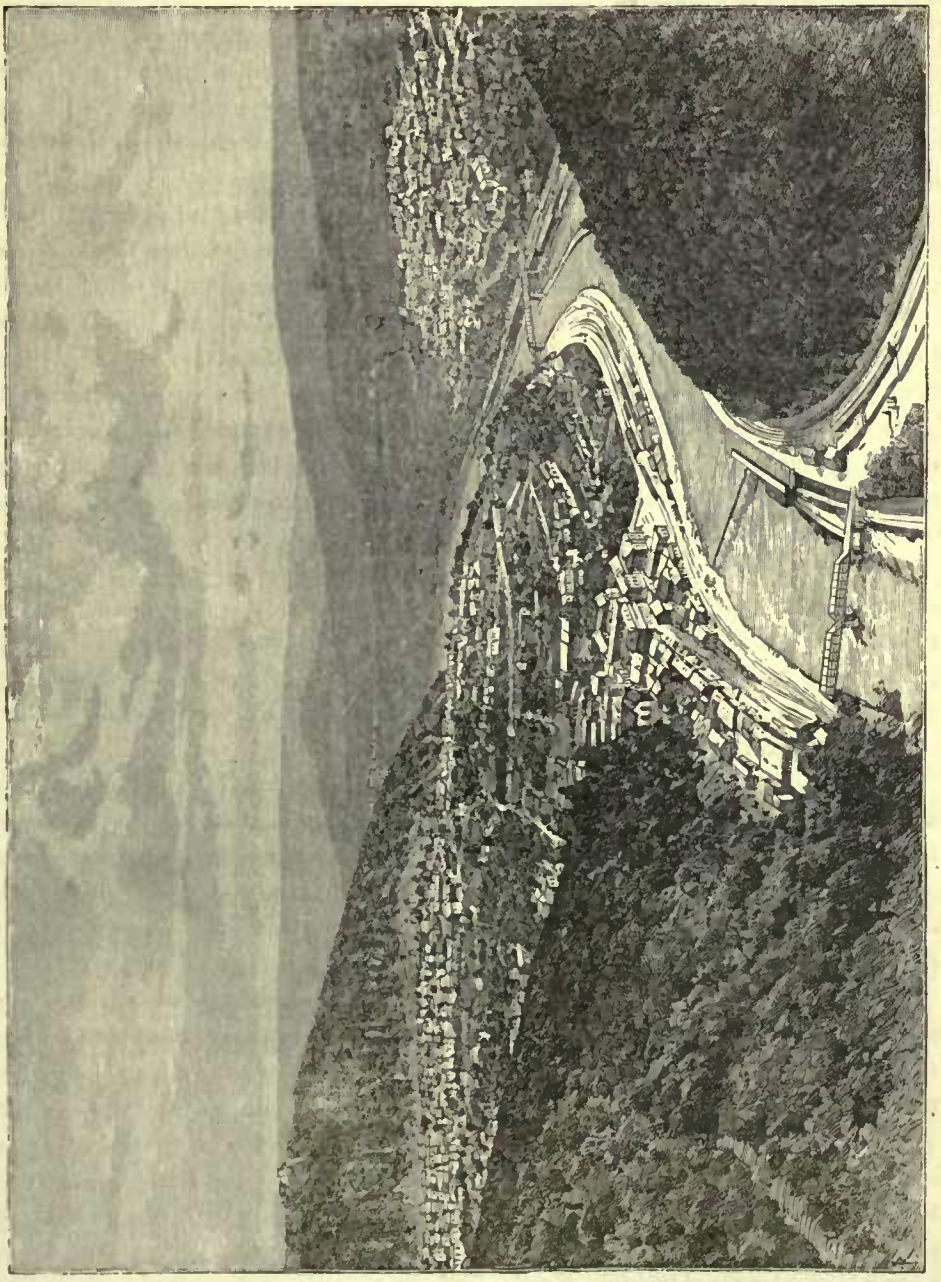


Fig. 62.—General View of Mauch Chunk.

surpassing those of all the rest of the Union, taken altogether. The abundance of the various combustibles, anthracite and bituminous coal, and the ease with which they can be extracted; the wealth of iron ores, the extensive underground reservoirs of petroleum and natural gas, have given to this region a prepon-

derating part in mining and metallurgic operations, a part which has even been increased by the protective tariffs dictated to the Federal Congress by the Pennsylvanian capitalists. The first settlers were evidently mistaken in their forecast of the future development of the state, for which they chose the device: "*Vinum, linum et textrinum.*"

The Delaware River, forming the boundary of Pennsylvania towards New Jersey, has no large towns in the upper and middle sections of its valley. Here the more frequented places along its banks are the groups of villas and hotels situated on the "water gap" excavated by the erosive action of the stream in forcing its way through the Blue Mountains.

The city of *Easton*, at the confluence of the Delaware and Lehigh Rivers, covers the slopes of another gap, and is connected by a bridge across the Delaware with its dependency of *Phillipsburg* in New Jersey and by another bridge across the Lehigh with its suburb of *South Easton*. Like *Allentown*, higher up the Lehigh valley, Easton is a great depôt for the anthracites mined beyond Lehigh Gap on the other side of the Blue Mountains. The space of about 18 miles between Easton and Allentown is almost entirely occupied with a succession of tall furnaces and other metallurgic works. Easton stands on the spot where the colonists had famous conferences with the Mohawk Indians in 1758, and with the Five Nations in 1761.

Above Allentown the borough of *Bethlehem* is associated with the missions of the Moravian Brothers, who established themselves in this district in the year 1741. Here is still their chief American station, with a theological seminary and an academy for girls. Bethlehem is connected by a bridge across the Lehigh with *South Bethlehem*, seat of the Lehigh Episcopalian University, founded and richly endowed by Asa Packer in 1866.

Mauch Chunk, that is, "Bear Mountain," in the Algonquin language, takes its name from a cone-shaped peak of that name rising over 650 feet above the narrow Lehigh valley. Near this spot were found the first specimens of anthracite, towards the end of the last century, and here the first mines were opened. The town, pent up in its narrow gorge, develops its canal, its two long streets, its railways all in parallel lines round the reddish escarpments of the mountain.

Here was first applied the switchback principle to a railway nine miles long, opened in the year 1827 for the transport of coal from Mauch Chunk to Summit Hill, over the intervening Mount Pisgah. The trucks are drawn up a first incline by a stationary engine, then descend the opposite slopes by their own gravity, the momentum thus acquired carrying them up the next ascent, and so on. But the principle has not been found to answer in a general way, and switchbacks are now chiefly used for purposes of amusement, affording a pleasant change from the somewhat monotonous motion of merry-go-rounds. Even the Mauch Chunk line is now used mainly for pleasure trips. One of the neighbouring mines has been burning for half a century, the ground slowly subsiding in the form of a crater above the underground fire.

The anthracite beds, which begin near Mauch Chunk, belong to a coalfield

which extends south-westwards parallel with the main axis of the Appalachian range; *Pottsville*, the chief town of the upper Schuylkill valley, occupies about the centre of these deposits.

Reading, which also lies in the Schuylkill basin, at the converging point of several lateral valleys, is one of the great cities of Pennsylvania. Founded by Penn, it received the name of the capital of Berkshire, in England, and is itself capital of the Pennsylvanian Berks County. But the dominant population is German—at least, in origin, if no longer in speech, English having long been the prevailing language in the district.

Philadelphia, the "city of brotherly love," recalls by its very name one of the most touching episodes in American history, the arrival of William Penn amongst his "brothers," the Lenâpé Indians of the surrounding forests. Landing at the spot on the Delaware where now stands the little town of *New Castle*, he first visited the flourishing Swedish settlement of Wicaco, and then ascended the river as far as the peninsula formed by the confluence of the Delaware and Schuylkill, where he founded the new city, in order, as he expressed it, "to afford an asylum to the good and oppressed of all nations, to frame a government which might be an example to show men as free and as happy as they could be."

Down to the beginning of the present century the sacred Shackamaxon elm was still shown, under which Penn had his famous interview with the natives. The very ground on which stood this tree, on the right bank of the Delaware, had for centuries been neutral territory, a sacred spot where the delegates from all the coast tribes between the Hudson and Potomac estuaries came to kindle their "council-fire." The site of the ancient elm is indicated by a simple stone block, in the most crowded part of the quays lining the banks of the river.

The place chosen by Penn as the centre of the future city lay almost exactly midway

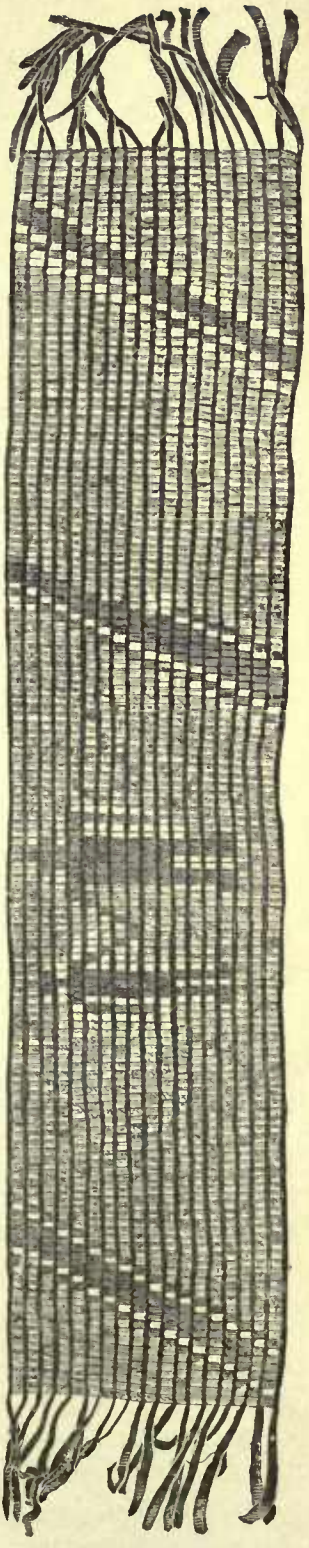


Fig. 63.—Penn Wampum Belt.

(This is believed to be the original Wampum Belt delivered by the Lenni-Lenâpé Sachems to William Penn at the celebrated Treaty under the elm-tree at Shackamaxon in 1682.)

across an isthmus nearly two miles wide, formed by two bends of the Delaware and Schuylkill. The low-lying flat plain south of this isthmus gradually merged in the swamp of the confluence, while northwards rose some forest-clad gravel heights. The whole space between the two rivers has now disappeared beneath streets and structures of all kinds, extending three miles to the south and as many as nine to the north of the spot marked out by Penn. The city has, moreover, crossed both streams, and developed new quarters to the east and west beyond them.

Philadelphia, which was for a time the federal capital, and the most populous city of the Union, has been outstripped in size by New York since 1822, and recently by Chicago. Nevertheless, it remains one of the great cities of the world for population, having over a million inhabitants, while for superficial extent it has but few rivals, being probably exceeded only by London and Chicago. An oblique line drawn from its north-east extremity on the Delaware to its south-west end on the Schuylkill traverses an unbroken succession of streets for a total distance of no less than 15 miles.

This extraordinary growth of Philadelphia is partly due to the fact that most of the householders are the owners both of the dwellings and of the ground on which they stand—in fact, at once house-owners and landlords, the land being largely freehold. Hence its title of "City of the Homes," which, however, does not apply to some hundred thousands of the proletariate classes attracted to the numerous factories of this great hive of industry. For miles and miles there follows an endless succession of streets and whole quarters, for the most part covered with low houses, each owned separately. Philadelphia takes also the name of the "Quaker City," from the religion of its founders.

The central quadrangular space, whence radiate the four main thoroughfares, is occupied by the City Hall, a sumptuous monument in white marble, which has been in progress since 1871, at an annual rate of expenditure of from $400,000 to $600,000. The tower, which stands on one side of the central court, has already (1891) reached a height of 300 feet, and is ultimately to be carried to 450 feet, terminating in a statue of Penn no less than 36 feet high. The highest point of this superb Renaissance pile, which covers an area of four and a half acres, will thus be visible beyond all the surrounding hills and forests.

In its general plan Philadelphia presents the regularity of a chessboard, except where the lines of railway have ruthlessly thrust themselves in and broken up the original symmetry of the rectangular streets and squares. But with all this general primness, the city is by no means a model of cleanliness, and certain quarters, especially in the proximity of the shipping, are little better than open sewers. It also still remains unconnected with its eastern suburbs of *Camden* and *Gloucester City* in New Jersey by any viaducts over the broad channel of the Delaware, though the narrower Schuylkill is already crossed at many points by bridges for railways, pedestrians and wheeled traffic.

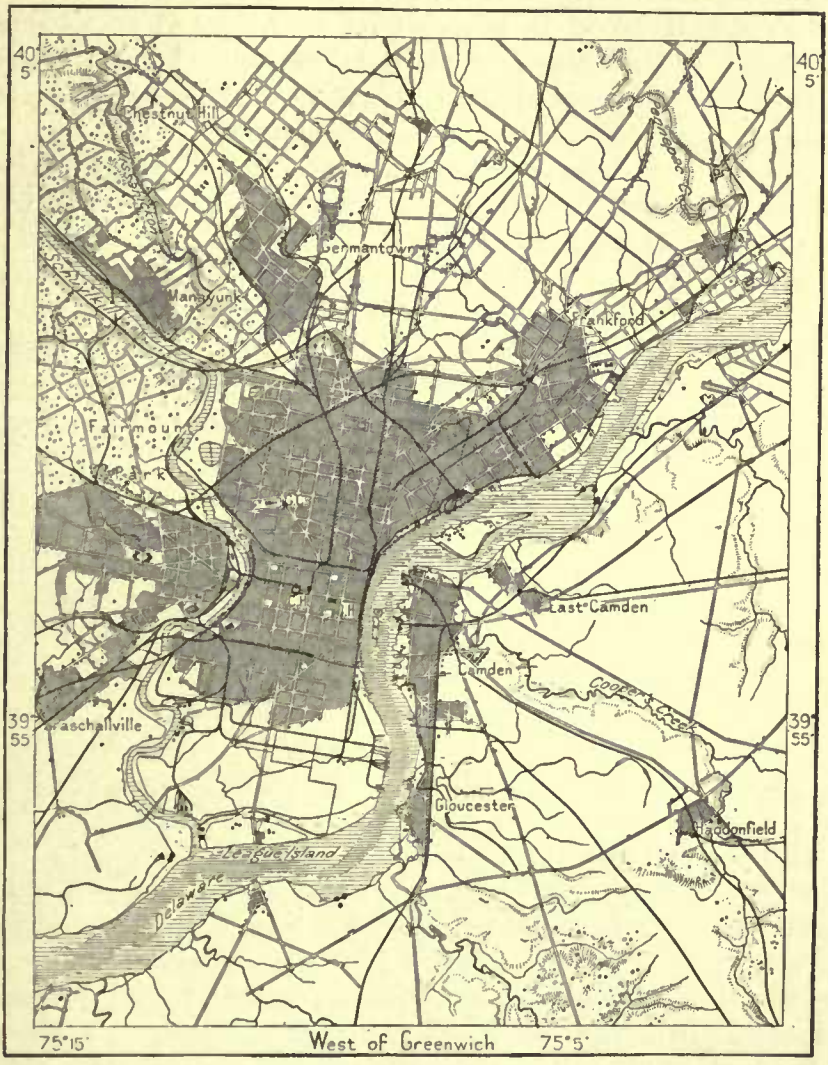
Of buildings associated with the local history the most famous is Independence Hall, an unpretentious structure, shaded with fine trees, where, on July 4th,

INDEPENDENCE HALL, PHILADELPHIA.

1776, the Independence of the Colonies was declared by their delegates in Congress assembled. It has now been transformed into a historical museum. Another noted monument is an orphan asylum, which, with its vast annexes, affords

Fig. 64.—PHILADELPHIA.

Scale 1 : 210,000.



accommodation for from 1,200 to 1,500 inmates. This Corinthian edifice takes the name of Girard College from its founder, a Bordeaux merchant, who bequeathed $2,000,000 with lands and houses to the city of Philadelphia, where

he had amassed an immense fortune. By one of the clauses in the deed, all priests, missionaries and ministers of any sect are excluded from the administration, and even barred from entrance into this richly-endowed college.

Philadelphia also possesses a university, an academy of natural sciences, some fine collections, and a splendid zoological garden in Fairmount Park, besides an Academy of Music, several libraries, colleges, benevolent and learned institutions. It has also preserved some of the privileges which it enjoyed while capital of the Union. Here is still the United States Mint; and League Island, 600 acres in extent, about the confluence of the Delaware and Schuylkill, has been reserved as a federal arsenal and dockyard for the United States Navy.

Philadelphia is one of the great manufacturing cities of the republic, especially for hardware, machinery, locomotives, sugar refineries, carpets and other textiles, furniture, boots and shoes, and chemicals. In 1890 the total yield of these industries was valued at no less than $200,000,000. Its foreign trade gives it the rank of fourth port in the Union, the chief exports being coal, petroleum, grain, and the products of the local factories. The Atlantic steamers and sailing-vessels engaged in the foreign and coastwise traffic bring return freights from Europe, the West Indies, the neighbouring seaboard, and South America, while a direct trade is carried on with New York by the canal traversing the State of New Jersey. The total exchanges amounted in 1890 to nearly $80,000,000, and the commercial fleet belonging to this port had a collective burden of 256,000 tons in the same year.

The numerous basins, wharves, docks, and piers lining both rivers exceed a total length of 19 miles. But this great Pennsylvanian seaport has the disadvantage of being situated about 120 miles from the coast, while the Delaware estuary opens, not eastwards in the direction of Europe, but southwards in the direction of the comparatively little-frequented southern waters. But, on the other hand, deep canals afford direct communication between the Delaware basin and the ports of New York and Baltimore. Below Philadelphia the Delaware itself is occupied by some advanced seaports, such as *Chester*, on the right bank, which lies within Pennsylvanian territory.

Fairmount, the finest public ground in Philadelphia, and one of the noblest parks in the whole world, one where the illusion of being lost in the sylvan charms of natural scenery, remote from all human habitations, is most complete, stretches north-west of the city proper along both banks of the Schuylkill, and also embraces the wild, rocky glen traversed by the Wissahickon Creek flowing to the Schuylkill. It covers an area of nearly 3,000 acres, and measures in one direction a distance of 13 miles.

It was in order to preserve the purity of the Schuylkill waters for the use of the citizens that the municipality acquired the valley of the river, and the surrounding park takes its name from Fair Mount, the eminence on which is situated the great reservoir. The level of the stream has been raised by a huge dam, by which a portion of the current has been deflected to the basins, and the old falls effaced. Till recently the grounds of Fairmount lay altogether in the outskirts; but now the park is being encircled south, east, and north by various quarters of

Philadelphia. The *Manayunk* and *Germantown* districts already form north-western suburbs of the city, which, in 1890, contained over 200,000 houses.

Most of east Pennsylvania is comprised within the Susquehanna basin, which rivals that of the Schuylkill in the extent of its anthracite deposits. To the abundance of this combustible, and the ease with which it is mined, is due the rapid development of *Scranton*, already one of the large cities of the state.

The city is situated in the northern extension of the Wyoming Valley, which is watered by the Lackawanna River, but the stream is too small for the transport of the fuel; hence the output is partly forwarded by rail to all quarters, partly consumed on the spot by the numerous factories that have sprung up round about the coalpits.

Some 10 miles to the south-west the Lackawanna joins the Susquehanna at its eastern bend, corresponding to a parallel curve described by the Delaware. Here begins the charming Wyoming district, famous in the history of the colonisation for the massacre of 1778. The inhabitants of the valley, having no time to escape, were scalped by the Indians and the country remained unoccupied till the conclusion of peace with Great Britain. Then Wilkes and Barré, two of the former settlers, returning to the Wyoming valley, founded, on the north branch of the Susquehanna, the town which bears their name. In the vicinity of *Wilkesbarre* is situated the great "Mammoth Vein," an exposed bed, 30 feet thick, of nearly pure anthracite, and of excellent quality.

The western branch of the Susquehanna, whose chief sources rise in the heart of the Appalachian plateau, has no important town above the gorge where it emerges from the plateau region. Below this point stands the city of *Williamsport*, principal point for the distribution of the lumber floated down by the tributary streams during the freshets. Williamsport, a favourite summer resort, is connected with the south bank of the river by a fine suspension bridge, above which is the great "Susquehanna Boom," capable of holding 300,000,000 cubic feet of lumber.

Below the confluence of the two Susquehannas, the united stream successively pierces several parallel ridges and, after escaping from the gap of the Blue Mountains, passes under the four bridges of *Harrisburg*, political capital of Pennsylvania, but otherwise a city of somewhat secondary importance except for its metallurgic works—blast furnaces, rolling-mills, Bessemer steel, machinery and other factories. These busy workshops, which skirt the left bank of the Susquehanna for a distance of some miles, draw much of their raw material from the famous "Iron Mountain" near the post town of *Cornwall*, some 24 miles east of Harrisburg in the South Mountains range. The mountain is a triple-crested mass of a ferruginous ore containing about 50 per cent. of pure metal.

On the railway connecting the state capital with Philadelphia the chief station is the city of *Lancaster*, formerly "Hickory Town," one of the headquarters of the Mennonite body. At the end of the last century, when Philadelphia was still the seat of Congress, Lancaster was the most populous place in the interior of the United States. It stood on the main track of emigrants moving westwards, in

the midst of an extremely fertile district, which still yields the best wheat in Pennsylvania, and that which was first exported to Europe long before the settlement of the Western grain-growing territories. For years the wheat market was controlled by the "Lancaster barometer."

York, on the opposite side of the Susquehanna, 24 miles south-west of Lancaster, is also an active agricultural centre. It is noted in the history of the Union as the place where the federal Congress met in the year 1777, while Philadelphia was occupied by the British forces.

About 40 miles south-west of Harrisburg, in the region of rolling plateaux forming the divide between the Susquehanna and Potomac slopes, there stands a small post-borough, which, though little larger than a good-sized village, is one of the most frequented places in the Union. Such is *Gettysburg*, guardian of the memorable battlefield where General Meade gained a signal victory over the Confederates under General Lee, on July 3rd, 1863, just one day before the stronghold of Vicksburg, key of the Mississippi, was captured by General Grant. Pilgrims by tens of thousands flock during the summer season to this hallowed spot, where even deputations from the Southern volunteers come to fraternise with the veterans of the federal army. Monuments erected at great expense stand on the points where the fight was hottest, and every grave is marked by a block of white marble. From a distance may be seen the concentric circles of thousands and thousands of these blocks, arranged in regimental order and glittering amid the surrounding verdure, mute tributes of respect to nameless heroes.

A picturesque line of railway traverses the tortuous Juniata Valley, winding from gorge to gorge through the old domain of the Tuscarora nation and abutting about the sources of the river against the buttress of the Alleghany Mountains. Before the year 1854 the range was crossed by means of a "portage" formed by two inclined planes, on which the trains were drawn up by the endless cables of stationary engines. Here the crest of the watershed culminates at Blair's Gap, 2,325 feet above sea-level. But the portage is now replaced by a long semicircular gradient and two tunnels passing under the town of *Gallitzin*. Nevertheless, the Pennsylvania Railroad Company still maintains the centre of its system on this line between eastern and western Pennsylvania, all its chief workshops for locomotives, carriages and repairs being stationed at *Altoona*, on the east slope of the range, 116 miles east of Pittsburg.

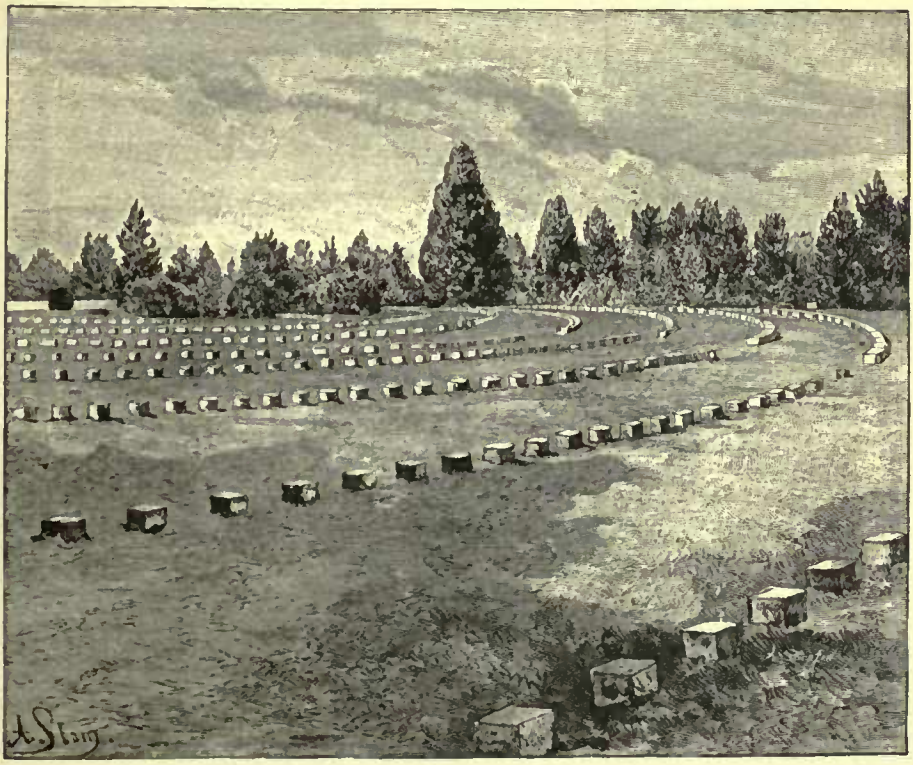
The western slope of Pennsylvania belongs almost entirely to the Ohio basin. The farthest headwaters of the Alleghany, one of the main forks of the Ohio, rise in the chain of redistributed moraines which skirt the southern shore of Lake Erie just south of the lacustrine port of *Erie*. This place, whose excellent land-locked harbour four miles long by one mile wide is enclosed by breakwaters, and by the former peninsula, now island, of Presque Isle, exports the petroleum and coal forwarded from the upper Alleghany basin.

Corry, *Warren*, *Titusville*, *Meadville*, *Oil City* and *Franklin* are all so many busy centres of the natural oil industry, so that the whole district is everywhere dotted over with the scaffolding 25 or 30 feet high raised in the form of

truncated pyramids over the wells, on the slopes of the hills, along the water-courses, in the middle of the plains, and even in the towns themselves. Altogether as many as 60,000 shafts have been sunk in this part of western Pennsylvania. The same region, so rich in underground treasures, also possesses extensive deposits of salt, discovered at depths of 1,500 and even 2,500 feet by those engaged in sinking the oil-wells. The village of *Warsaw* and the surrounding district in the adjacent State of New York already produce more salt than Syracuse, as stated on page 151.

Johnstown, a railway-station on the slope of the Alleghanies on the line running from Philadelphia through Pittsburg to Chicago, is already a little Pittsburg

Fig 65.—Gettysburg Cemetery; Grave of Nameless Soldiers.

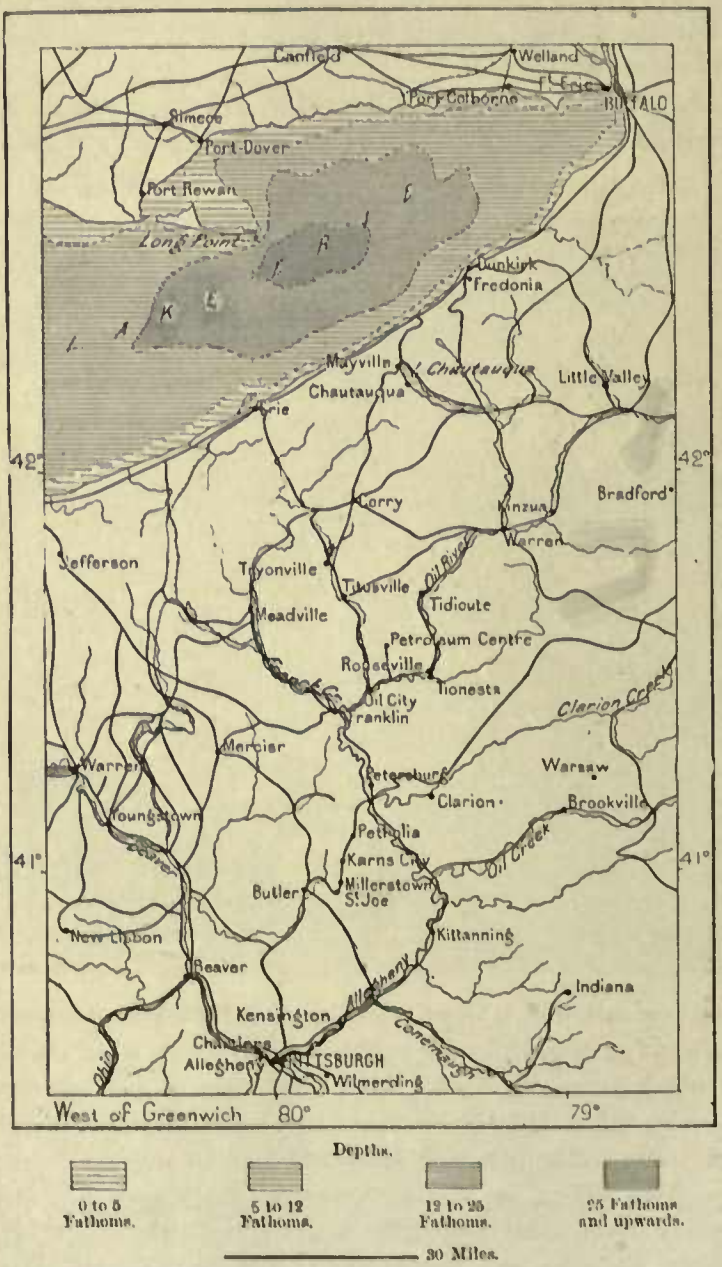


with its numerous metallurgic works vomiting fire and smoke day and night. It was the scene of a frightful catastrophe in May, 1889, when the Conemaugh River, on which it stands, flooded its banks. The inundation was followed by the bursting of a large reservoir, which, with the burning of railway stations and trains, suddenly buried Johnstown and its suburbs under a mass of mud and smoking débris, swallowing up nearly 2,300 persons. Johnstown is now recovering from this tremendous disaster, and thousands of workmen, especially Poles, Slovacks, and Ruthenians (Little Russians), collectively known as "Hungarians," are again engaged in the surrounding coal and iron mines. Farther on, the groups of workshops become more and more numerous in the direction of *Pittsburg*.

This great city, second in Pennsylvania for population, and one of the first in the United States as an industrial centre, is of comparatively ancient origin. About the middle of the eighteenth century the English and French were already

Fig. 66.—Oil and Natural Gas Region.

Scale 1 : 1,900,000.

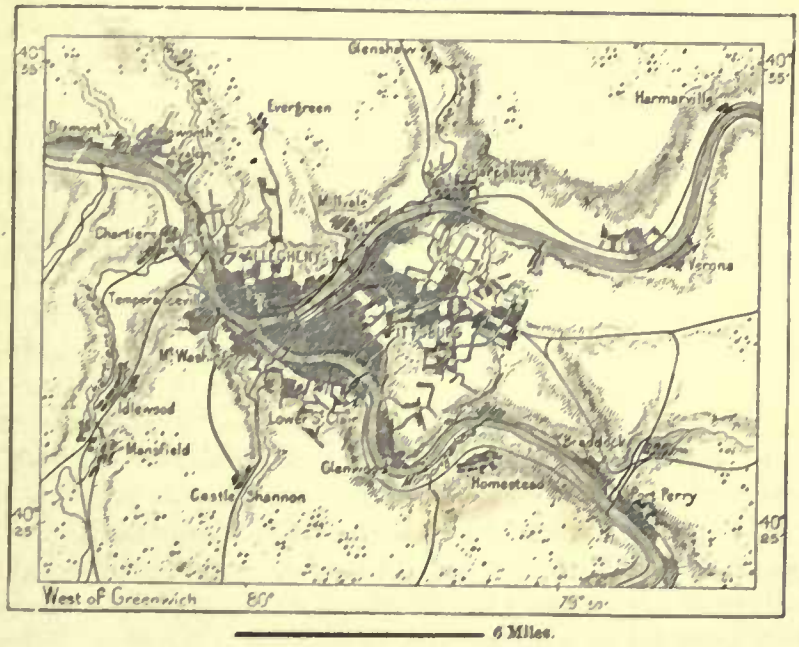


contending for the angular space comprised between the two rivers, Allegheny and Monongahela, whose junction forms the Ohio. The French, at first victorious, founded *Fort Duquesne* near the confluence, and repulsed two successive

attacks of the English. But in 1758 they had to evacuate this stronghold, which then took the name of *Fort Pitt*, or *Pittsburg*, in honour of William Pitt, then prime minister of England. A little fort dating from this epoch still exists amid the surging tide of new structures.

The representatives of the rival powers, struggling for the possession of this narrow corner of ground, regarded it merely in the light of a strong strategic and trading post favourably situated at the junction of two rivers commanding a long navigable waterway. But the discoveries of geologists have revealed other advantages little dreamt of by the first settlers. The extensive coal measures of the surrounding valleys, the underground lakes of rock oil and reservoirs of inflammable gas have given an enormous impulse to the local industries.

Fig. 67.—Pittsburg.
Scale 1 : 200,000.



The first workshops were opened in 1812, and since then the whole city, with the dependent town of *Allegheny*, on the opposite side of the river of like name, together with numerous other suburbs, has become one huge factory with innumerable tall chimneys. Such is the "Fire City," as it is called, while the less complimentary title of the "Smoky City" is considered by some to be no longer justified, since bituminous coal has been replaced in a large number of mills by the conduits of smokeless natural gas.

The industrial statistics of Pittsburg give evidence of a really prodigious industry. The yearly output of coal in the surrounding district now averages 20,000,000 tons, and 31 tall furnaces yielded in 1889 over 1,200,000 tons of pig iron, while 33 other workshops turned out 11,000,000 tons of steel and 640,000 tons of rolled iron, and the glass-works furnish products valued at $8,000,000. In 1890 the natural gas, supplied through conduits of a total length of 1,120 miles,

illumined over 30,000 buildings of all sorts, and the 880,000,000 cubic feet consumed during the year did the work of 8,000,000 tons of coal.

No branch of industry is neglected by the powerful productive processes of Pittsburg and the neighbouring Allegheny city pent up between the river and fringing cliffs. Besides iron and steel, here are produced glass, machinery, carriages, electric lamps, objects in aluminium, chemicals of all kinds, and a multiplicity of minor wares. Pittsburg, officially a port of delivery of the New Orleans district, is even a marine dockyard; but the craft constructed in these yards are flat-bottomed boats, steamers and barges, chiefly intended for the navigation of the Ohio and Mississippi. Pittsburg itself owns a considerable trading fleet, and the traffic carried on with the riparian ports along the Ohio and other navigable streams exceeds that of many busy places on the Atlantic seaboard.

Some 30 miles south-west of Pittsburg a post-borough, bearing the name of *Washington* in common with 200 other localities in the Union, has suddenly acquired a certain celebrity as one of the distributors of natural gas. *McKeesport*, a considerable borough, 15 miles south-east of Pittsburg, stands on the left bank of the Monongahela at its confluence with the Youghiogheny; about midway between the two places lies *Braddock's Field*, so named from the British general, Braddock, whose forces were nearly exterminated in 1755 by the French and their Algonquin allies. Washington, holding the rank of lieutenant, took part in the engagement.

10.—Maryland.

Maryland, formerly *Terra Mariæ*, so named in honour of Queen Henrietta Maria, wife of Charles I., is one of the smallest states of the Union; but its central position between Pennsylvania and the Southern States, on the debatable frontier so hotly contested during the Civil War, has made it one of the historical regions of North America. Formerly a slave state, it has at present a coloured population far more numerous than the neighbouring Pennsylvania.

Separated from Pennsylvania and Delaware by conventional straight lines, Maryland presents an extremely irregular frontier towards Virginia. The western counties are disposed in a narrow zone between the course of the Potomac and the Pennsylvanian frontier, and here are situated the coal and iron mines, as well as the most productive grain and fruit growing districts. In the central region of plains comprised between the course of the Potomac and Chesapeake Bay the first settlements were established, and here were developed those tobacco plantations to which the country was indebted for its commercial prosperity.

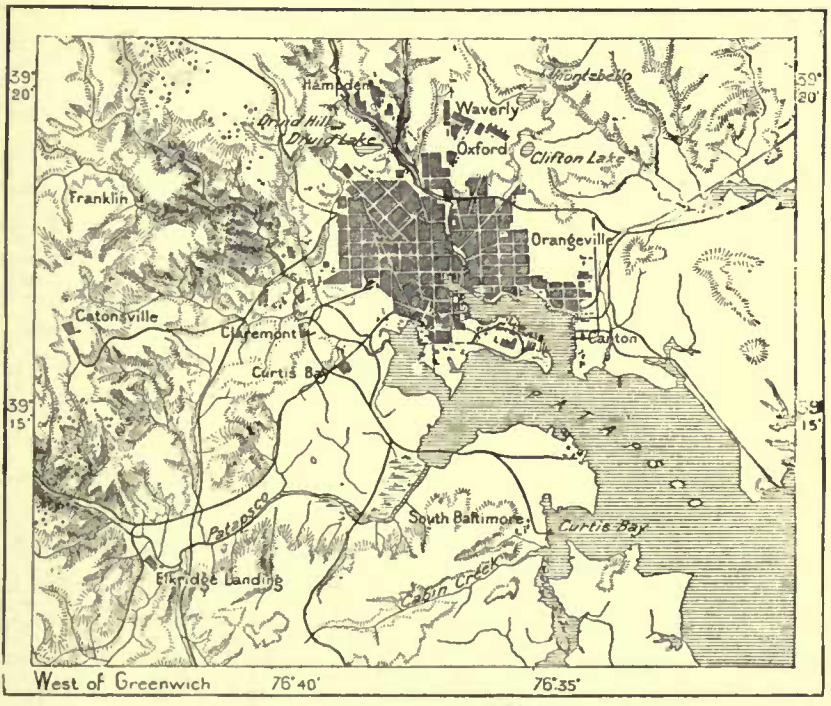
Within the state is also included the so-called *Eastern Shore* district, which lies east of Chesapeake Bay, forming part of the peninsula that stretches due south to the sharp headland of Cape Charles, across two and a half degrees of latitude. On the other hand Delaware occupies half of the east coast of this peninsula, the southern extremity of which belongs to Virginia. To the dissensions of the colonies between themselves before the Revolution is due this eccentric partition of the peninsula.

Havre de Grâce, the northern port of Chesapeake Bay, is accessible only to

light craft, the Susquehanna, which here reaches the estuary, being too shallow to admit large vessels. Two long viaducts cross the mouth of the river, one a wooden structure no less than 3,500 feet in length.

Baltimore, 36 miles farther south, named in honour of Lord Baltimore from an obscure village on the south-west coast of Ireland, has taken rank among the great cities of the Union; it is the seventh in population. A few settlers had already established themselves on the site of the present city so early as the year 1682. But its official foundation dates only from the year 1729, the position chosen for the new settlement being a low-lying peninsula north of the Patapsco River, which here enters Chesapeake Bay through a broad estuary. The extensive marshes

Fig. 68.—Baltimore
Scale 1 : 190,000.



encircling the rising colony have since been filled in with the remains of some neighbouring mounds gradually cleared away. Now Baltimore has not only absorbed the peninsula and the banks of the two lateral creeks, but also extends north and west for a space of at least 12 square miles, while its suburbs stretch away in long diverging avenues.

Baltimore, metropolis but not capital of Maryland, takes the proud title of the "Monumental City," and was really distinguished among American cities for the number and size of its edifices before the inhabitants of New York, Boston, Albany, Philadelphia, and Washington were stirred to emulation. Its chief Roman Catholic temple is the primatial church of that religion, of which Baltimore is the metropolitan see.

During the Civil War Fort McHenry, erected on the peninsula separating the two estuaries, held the city under the muzzles of its guns to prevent any rising on the part of the slave-holders. Yet the first actual conflict occurred in the streets of Baltimore. Few places are better supplied with good water. The Gunpowder River, retained in a succession of terraced lakes on the heights, feeds the reservoirs of the park on Druid Hill, whence a superb view is commanded of the roadstead and encircling shores. This source of supply is supplemented by the water derived from Lake Roland, seven miles distant.

Although Baltimore and its suburbs have extensive machinery, hardware and other industries, the chief occupation is trade, in which respect this seaport has even outstripped Philadelphia. It exports vast quantities of cereals and tobacco, and imports Brazilian coffee, while it is the principal market for the oyster trade, which since the middle of the present century has acquired an enormous development in the United States. As many as 37,000,000 bushels were here sold in 1889.

A steam ferry, large enough to receive a train of 27 cars, keeps up the railway communication from one side of the bay to the other, and helps to support an export trade, valued in 1890 at over $87,000,000, while the shipping entered and cleared represented a total burden of 1,969,000 tons. Baltimore has also recently taken a foremost position amongst the university cities of America. The Johns Hopkins University, so named from its founder, lies in the Clifton district, and is richly endowed; it is attended by numerous students, and to it is attached a vast hospital. Other educational or learned establishments are the Maryland Institute, a Baltimore city college, a state normal school and the Peabody Institute.

Annapolis, capital of Maryland, lies south of Baltimore, at the mouth of the Severn, on Chesapeake Bay. Though now a small place, it was at one time a rival of the neighbouring city, but having lost nearly all its trade, it now derives its chief importance from its legislative position, and from the United States Naval Academy. Thanks to its proximity to Washington, Annapolis has also become the central station of the United States navy in Chesapeake Bay. The foundation of *Providence*, as it was first called, dates from about 1650, but when chartered in 1708, it was re-named Annapolis in honour of Queen Anne.

The little havens on the opposite shore of the bay are almost exclusively engaged in the fruit and oyster trade. As many as 20,000 hands, with 800 sloops and 3,000 boats, are occupied with oyster culture, and in harvesting the molluscs during the season from September to April. But reckless fishing has already exhausted a large number of beds, so that the Chesapeake oyster-grounds are in great danger of losing the first position for productiveness. The villages, which during the fishing season are almost completely deserted by their male inhabitants, are erected on piles extending a long way into the shallow waters of the bay. *Crisfield*, largest of these villages, stands on Tangier Sound, and is known as the "Venice" of the eastern shores. One of the islets on this shore was the first land in the bay settled by the whites, who here established themselves in 1631.

In the western part of Maryland watered by the upper Potomac, the rich and

well-wooded Cumberland Valley contains extensive deposits of bituminous coal and iron ores. *Cumberland*, which has given its name to the district, is both an industrial and agricultural centre.

11.—Delaware.

Delaware, smallest state in the Union next to Rhode Island, bears the title of the "Diamond State," as if to imply that the worth of its inhabitants is in inverse proportion to the extent of their domain. It comprises scarcely one-fourth of the peninsula which is bounded by the two estuaries of Chesapeake and Delaware Bays. It thus consists of a narrow maritime zone, extending along the west side of Delaware Bay, and separated from the eastern shore of Maryland by two straight lines running in the direction of the meridian and of the parallel.

Except in the neighbourhood of its chief city, Delaware is engaged chiefly in agricultural pursuits, and, speaking comparatively, surpasses all other states in the production of fruits. Both its peaches and grapes (a small black variety of exquisite flavour) enjoy a high reputation.

Dover, capital of the state, lies on Jones Creek, near the west side of Delaware Bay; it is a small place, with little over 3,000 inhabitants, largely engaged in the fruit-preserving trade. *Wilmington*, the commercial city of Delaware, may be regarded, with *New Castle*, as one of the advanced ports of Philadelphia. It lies on the same side of the river, 22 miles farther down, and is visited by the steamers plying to and fro. Within the enclosure is shown the historic rock where the first Swedish immigrants, founders of the colony of Nova Suecia (New Sweden), landed in 1638. This colony, which extended up the Delaware River as far as Wicaco, now Philadelphia, was reduced by the Dutch from New Amsterdam in 1656, and thus passed into the possession of the English with the other Dutch settlements in 1664.

12.—The Federal District of Columbia.

As Delaware is enframed in the eastern part of Maryland, the Federal District of Columbia has been carved out of its south-western section. Despite its small size, not exceeding 70 square miles, the district is by no means the least important political division of the Union in population, industry, and especially public wealth.

The city of *Washington*, which contains nearly all the inhabitants of the district, no longer deserves its former title to the "City of Magnificent Distances," where interminable shady avenues, mostly destitute of houses, intersected each other at all angles. On the contrary, it has kept pace with the portentous growth of the Union itself, and is now really a great city, with a permanent population of nearly 250,000, increased during the sessions of Congress by many tens of thousands attracted to the spot by the endless interests associated with the public administration. The boulevards, which radiate from the central nucleus dominated by the Capitol, are for the most part lined with lofty structures, and in the season are crowded with pedestrians and vehicles.

Pennsylvania Avenue, which connects the Capitol with the White House and the public offices, shares most of the traffic with the boulevards in the

neighbourhood of the City Hall; but the lines of houses are continued for miles beyond these points. The north-western district of *Georgetown*, on the left bank of the Potomac, is already connected with the metropolis, as are also the south-east quarters stretching along the right bank of the Anacostia, an eastern affluent of the Potomac. The little river Tiber has disappeared altogether, transformed, like the London Fleet, to a sewer.

Washington has scarcely any artisan classes beyond those connected with the federal arsenal; nor, with few exceptions, are there any traders besides those engaged in supplying the local demands. But as a winter residence it already exercises considerable influence on northern society, while its vast museums and great scientific resources attract an increasing number of students, who take up their residence in this pleasant and well-kept city, the most liberally provided of any in the Union with gardens, avenues, and shrubberies.

The Capitol, political centre of the United States, stands on a low rising ground, whose gentle slopes incline westwards to the Potomac, eastwards to the Anacostia. The huge structure consists of three sections—in the north the Senate, in the south the House of Representatives, and, between the two, vast lobbies common to both divisions of Congress. In the centre a double rotunda, 96 feet in diameter, rising above the pediment, carries to a height of 310 feet an iron cupola terminating in Crawford's bronze statue of Liberty. The marble peristyles contrast strangely with the immense metal dome, and viewed as a whole the edifice, being too long for its cupola, lacks harmony. Nevertheless, it produces an imposing effect, thanks to its vast proportions, the beauty of the materials, the terraces and flights of steps supporting its base, and the numerous statues and splendid vegetation surrounding it

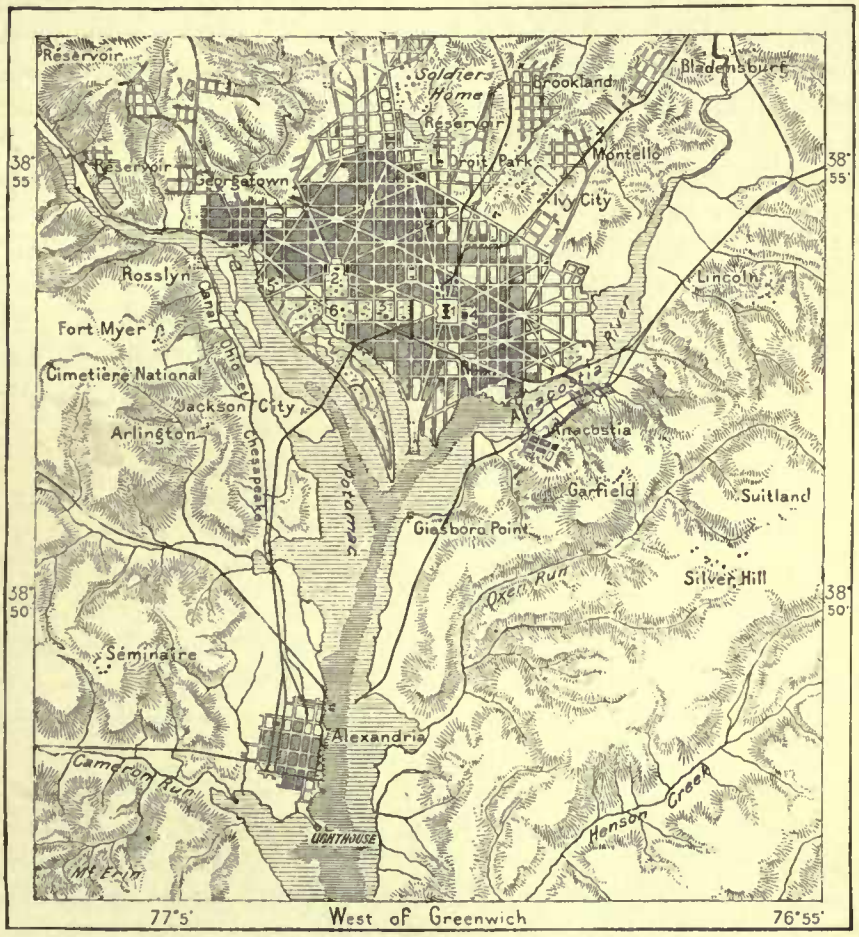
The interior of the rotunda is decorated with bas reliefs and numerous historic paintings, such as the "Landing of Columbus," by Vanderlyn; "The Baptism of Pocahontas," by Chapman; "Hernando de Soto's Discovery of the Mississippi," by Powell; "The Embarkation of the Pilgrims," by Weir; "The Surrender of General Burgoyne," "The Surrender of Lord Cornwallis," and "Washington resigning his Commission at Annapolis," all by Trumbull. Besides the special libraries of the upper and lower chambers, the Capitol also contains the magnificent Congressional Library, the richest in the New World. Unfortunately the space is quite inadequate for the proper housing of these half a million volumes piled up in the galleries and in the very cellars of the Capitol. Hence students are impatiently awaiting the completion of the new building now in progress in the immediate neighbourhood, where ample room will be provided, not only for the treasures of the present library, but for its future expansion to the extent of about three and a half million volumes altogether. A library of such dimensions is by no means too large for an age in which books accumulate at the rate of 50,000 a year, not to speak of 50,000 newspapers, and other documents in myriads. By Act of Congress publishers are bound to deposit in the Congressional Library copies of all works copyrighted in the United States.

On a grassy slope about 1½ mile north-west of the Capitol stands the so-called

"White House," that is, the President's official residence, a two-storeyed structure of greenstone, painted white, with a frontage of 170 feet on Pennsylvania Avenue, with extensive ornamental grounds. The White House is flanked by two vast piles, the Treasury, some 600 by 200 feet, with 500 rooms, and the

Fig 69.—Washington.

Scale 1 : 160,000.



1. Capitol. 2. The White House. 3. Smithsonian Institution. 4. New Library. 5 Observatory. 6 Washington Monument.

Depths.

0 to 2 Fathoms.

2 Fathoms and upwards.

3 Miles.

building of the State Department, containing the various ministries, the largest granite structure in the world.

Washington possesses many other large public buildings needed for the efficient administration of such a country as the United States. Amongst them are the General Post Office, a superb edifice in white marble 204 by 102 feet; the Patent Office, covering an entire square, and the Department of Agriculture, with

library, herbarium and greenhouses. In the neighbourhood is the Washington Monument, a marble obelisk 560 feet high, the tallest structure in America.

As the political capital of the republic, Washington naturally enjoys the special favour of Congress, and of all American cities it is the most liberally adorned with public statues, nearly all erected to the memory of presidents and generals. One of the groups, representing Lafayette and his associates in arms, is the joint work of Mercié and Falguière. There are also galleries of paintings, statues, and bronzes; but the most valuable treasures are those contained in the various departments of the Smithsonian Institution, so named from a wealthy English merchant who bequeathed to the American nation a sum of $600,000 for the purpose of creating a scientific establishment, "for the increase and diffusion of knowledge amongst men." In the central structure, a fine Romanesque building, 450 by 140 feet, are admirably arranged the extensive collections of the United States National Museum. The Bureau of Ethnology is also connected with the Smithsonian Institution, which has amply fulfilled the promises made at its foundation, and which has perhaps given a greater impulse to scientific research than any similar establishment in the whole world. To the Medical Museum is attached an extremely rich library, and the catalogue of medical works issued by this institution is the most complete in existence.

Washington had long the reputation of being an unhealthy city, and the United States Naval Observatory, occupying a commanding position south-west of the White House, near the marshes formed by the Potomac, above its confluence with the Anacostia, was almost uninhabitable. But the low-lying lands have been drained, and transformed to a public park. The flow of the river has been regulated and a muddy estuary changed to a convenient harbour accessible to small steamers and coasting-vessels. An abundance of pure water is obtained from the great falls of the Potomac, some 18 miles higher up, by an aqueduct carried through eleven tunnels and six bridges.

The health of the city has also been improved by extensive plantations of over 60,000 trees of 37 different species lining 120 miles of streets. In the north there are some extensive pleasure-grounds, such as the fine parks surrounding the Soldiers' Home, for disabled soldiers of the regular army, and the Howard University, a non-sectarian school of higher instruction, founded immediately after the Civil War for young negroes of both sexes.

The "Long Bridge" crossing the Potomac, south of the Washington Monument, some remains of fortresses on the summit of the neighbouring hills, and on the right side of the river the Arlington National Cemetery, where 16,000 soldiers were interred—are all so many memorials of the great struggle for the possession of Washington.

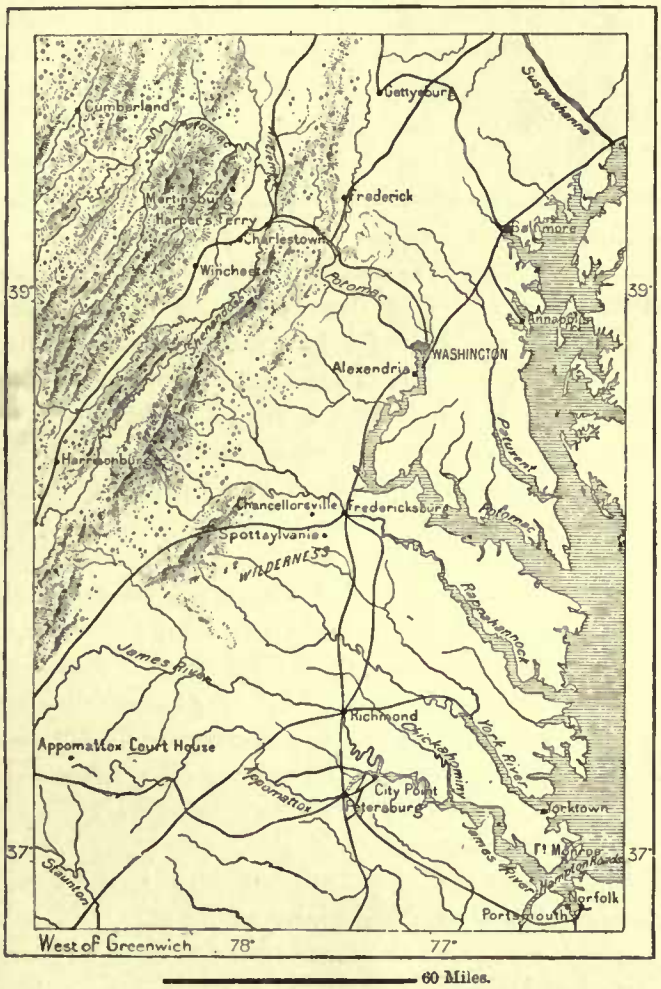
About seven miles farther on, an eminence commanding an extensive panoramic view over land and water is occupied by *Mount Vernon*, where Washington lived and died. It now belongs to a society of ladies, who regard it as a pious duty to embellish this famous place of pilgrimage. They propose to construct a "sacred way" 14 miles long, crossing the river near the Observatory, and

connecting Washington directly with Mount Vernon, the whole distance to be planted with trees and ornamental grounds.

13.—Virginia.

Virginia, to which its children still give the name of the "Old Dominion," both on the ground of its relative antiquity and in memory of its past political

Fig. 70.—Scene of the Civil War in Virginia.
Scale 1 : 3,000,000.



preponderance, has greatly fallen from its former proud position. Down to the year 1811 it was the most populous state in the Union, and during the War of Independence the commander-in-chief and the foremost leaders of the rising confederation were drawn from its landed aristocracy. Then it became the "Mother of the Presidents," the other states tacitly conceding to it a sort of prerogative in the selection of the heads of the Federal Union.

With each successive census the Old Dominion falls one or more steps behind in the race, and during the Civil War the trans-Alleghany section, differing

in its geographical relations and to some extent in the social conditions of its inhabitants, became detached and reconstituted as a separate state under the name of West Virginia. But even thus dismembered of this valuable territory, which is comprised within the Mississippi (upper Ohio) basin, Virginia still remains one of the powerful states of the Atlantic slope. In its physical conformation it presents the greatest diversity of aspect, including the Appalachian ranges in the west, the hilly "Piedmont County" on the eastern slope, inclining eastwards to the "Middle District" and south-eastwards to the "South Side," the lovely "Valley of Virginia" in its central part, the so-called "Little Tennessee" country in the south-west, the "Tidewater District," east and south-east of the Piedmont region, the detached "Eastern Shore" on the east side of Chesapeake Bay, and the low-lying marshy coastlands farther south.

Here might be cultivated all the plants of the temperate zone, and the country is certainly large and fertile enough to support many millions of inhabitants. But the plantations, recklessly worked for one or two centuries without manuring the land, have in many places exhausted the soil, while a considerable section of the population has been ruined by the sudden transition from the system of slavery to that of free labour; hence for years vast tracts of land have lain fallow.

Next to cereals the staple crop is still tobacco, which during the seventeenth and eighteenth centuries had enriched the Virginian planters. Tomatoes, leguminous and other vegetables, besides a considerable variety of fruits, such as peaches and grapes, are also raised in large quantities, both for the home consumption and the northern markets.

In Virginia the coloured element represents two-fifths of the whole population. The blacks of this region are in general distinguished for their tall stature and physical strength. During the old régime the annual increase of the negro families, bred on the Virginian plantations like so much livestock, supplied a large export trade in slaves for the lower Mississippi regions. But the planters, who controlled this traffic, made a selection, reserving the best "stock" for themselves, and exporting the less intelligent negroes, such as those incompetent for any work beyond field operations. Thus the race was gradually improved by the annual weeding out of inferior stock.

During the Civil War the most hotly-contested territory was that lying between Washington and Richmond, capital of Virginia. Few even of the European "cockpits" have been the scene of more bloodshed. *Fredericksburg*, south of the Potomac, skirts the foot of a hill whose crests, held by the Confederate forces, defended the passage of the Rappahanock. Farther south, the so-called *Wilderness*, a gently rolling district, diversified with glens and woodlands, was the theatre of the indecisive, sanguinary battles of *Spottsylvania Court House*, and *Chancellorsville*. The ground was disputed with the same obstinacy all the way to Richmond and Petersburg.

Richmond, headquarters of the Confederate forces and capital of the Confederacy during the years 1861-65, does not rank as one of the great cities of the Union. In 1890, nearly a century and a half after its foundation, its population still fell

RICHMOND—VIEW TAKEN AT THE JAMES RIVER RAPIDS.

short of 100,000. Nevertheless, in the Southern States, New Orleans alone exceeds it in the number of its inhabitants, and even this place is inferior to it in manufacturing industry.

Built, like Rome and Byzantium, on "seven hills," hills, however, not steep enough to prevent the city from developing its streets and boulevards on the usual regular plan, Richmond is a pleasant, picturesque place, whence a wide

Fig. 71.—Tobacco: Drying the Plant.

prospect is commanded of the James River valley and surrounding plains. There are a few fine buildings, such as the new city hall, an imposing limestone block near the central park, and the Capitol, which, from its commanding position on Shockoe Hill, dominates the whole city. Here are the state library, with valuable colonial archives, several portraits of historical characters, and Houdon's marble statue of Washington. In the grounds are the statues of Henry Clay

and General Thomas J. Jackson, and Crawford's Washington Monument, a fine group of sculpture, comprising a colossal equestrian bronze of Washington, with two tiers of pedestals supporting statues of Patrick Henry, Thomas Jefferson, and other worthies, and seven symbolic figures. In the fashionable north-west quarter another monument, dedicated to General Lee, hero of the Civil War, has been erected on Leonard Height. Conspicuous amongst the learned institutions is the Virginia Historical Society, whose publications are indispensable to the student of early colonial history.

Fig. 72.—Entrenched Camp at Richmond during the Civil War.
Scale 1 : 470,000.

Richmond occupies, on the left bank of the James, the most favourable site in the valley for trade and industry. Just above the city the river descends about 100 feet through a series of rapids, which supply throughout the year the motive-power for the flour-mills and other industrial establishments. Conspicuous amongst these are Allen & Ginter's cigarette-works, and Valentine's meat-juice factory, the produce of which is exported to every part of the civilised world.

Farther down, the Atlantic tides ascend about 150 miles to the quays of Richmond, which is now accessible to vessels of considerable draught. Formerly the James was not navigable at this distance from the sea by ships drawing more than 8 or 10 feet; but the channel, dredged to a depth of 20 or 22 feet, now enables large sea-going vessels to reach the Virginian capital. On the other hand the navigable canal, which formerly turned the rapids and penetrated 210 miles up the fluvial valley into the heart of the Alleghanies, has been superseded by the James River railway, one of the most picturesque lines in the world.

Numerous foundries line the river, both at Richmond and in the neighbouring industrial town of *Manchester* on the opposite side of the river.

Founded in 1737 by William Boyd, Richmond has been the capital of the state since the year 1780. It was named from the pleasant town of Richmond on the Thames above London, in reference to a certain resemblance observed by the first settlers between the surrounding scenery of both places.

Petersburg, 27 miles farther south, occupies, on the Appomattox, a position analogous to that of the capital on the James. It is conveniently situated on the right bank of the river just below the falls at the head of the tidewater, some 10 miles above the port of *City Point*, at the confluence of the two rivers 40 miles below Richmond.

Large vessels ascend the James estuary to City Point, while the Appomattox is navigable for lighter craft as far as Petersburg.

During the Civil War, Petersburg was the southern bulwark of the vast entrenched camp of which Richmond occupied the northern extremity, and after an heroic defence both places fell simultaneously into the hands of the Federal forces. Towards the east the formidable position, also defended by several parallel lines of earthworks, was also protected by the neighbouring marshes and their malarious exhalations. The east front of the military lines at one time ran back of the famous village of *Yorktown*, already memorable for the capitulation of Lord Cornwallis on October 19th, 1781, which brought the War of Independence to a triumphant issue. Fortified by the Confederates, Yorktown offered an insuperable barrier to the advance of General MacClellan on Richmond in 1863. But the combined efforts of Grant, Sherman, and Sheridan, pushing forward from the north and south, compelled the forces of General Lee to evacuate Richmond, which had been so hotly contested for a period of four years. The Confederates, greatly reduced in numbers, broken by hunger and hardships, withdrew towards the open plains of the west in the hope of reaching Lynchburg in the fertile Piedmont district, and thence fall back on the upland valleys of the Appalachian Mountains. But being overtaken by General Grant, Lee was compelled to surrender on April 9th, 1865, near *Appomattox Court House*, about the source of the Appomattox River. This was the closing event of the Civil War.

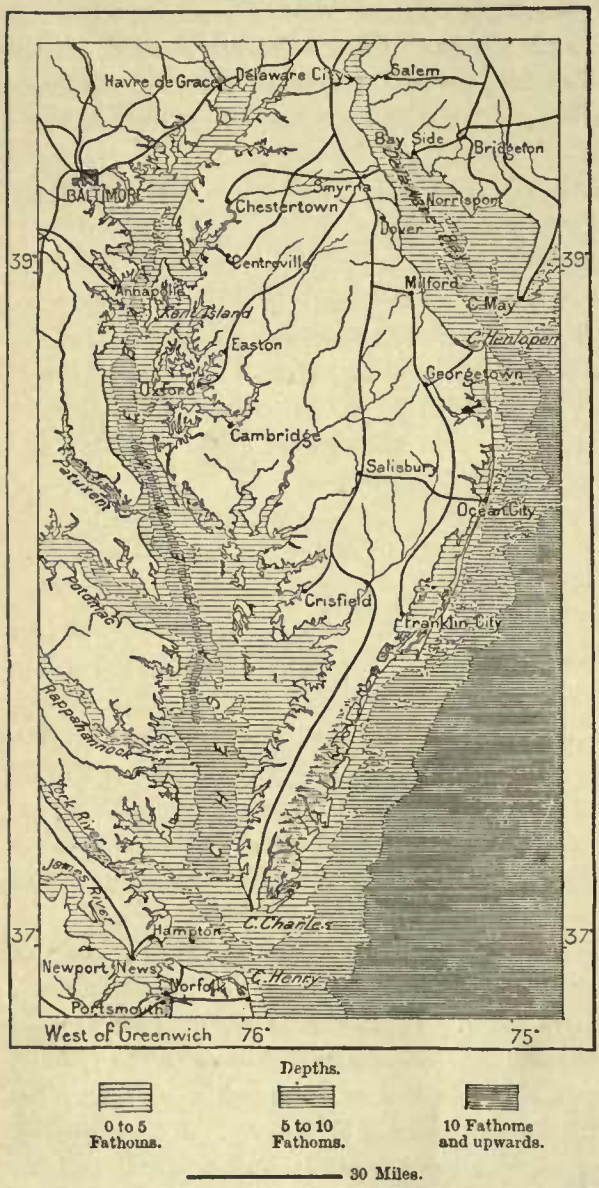
The intellectual centre of the Shenandoah Valley is the picturesque town of *Lexington*, at the western terminus of the former James River and Kanawha canal, about 32 miles north-west of Lynchburg. Lexington is the seat of the old Washington College, of which General Lee became president after the close of the Civil War. From this circumstance the institution, which was reorganised in 1871, was then re-named the Washington and Lee University. In the memorial chapel here erected to his memory is seen the beautiful recumbent statue of the Confederate commander-in-chief, executed in white marble by Edward Valentine, of Richmond.

In the neighbouring cemetery stands another fine statue by the same sculptor, erected in honour of Thomas Jefferson ("Stonewall") Jackson, who fell at the battle of Chancellorsville, May 2nd, 1862.

In the hilly district some 40 miles north-east of Lexington is situated the picturesque town of *Staunton*, noted for its numerous female educational establishments, and seat of the Western Lunatic Asylum, and of a Deaf, Dumb, and Blind Institution, where over 700 pupils receive instruction. About 40 miles east of Staunton, and 98 miles north-west of Richmond, stands the post-town of *Charlottesville*, seat of the University of Virginia, which was planned by Thomas Jefferson, and endowed by the state about the year 1820. Attached to this institution, which has a staff of 18 professors, are a valuable library of nearly 50,000 volumes, and an observatory crowning the neighbouring Mount Jefferson.

Fig. 73.—Chesapeake Bay.

Scale 1 : 2,500,000.



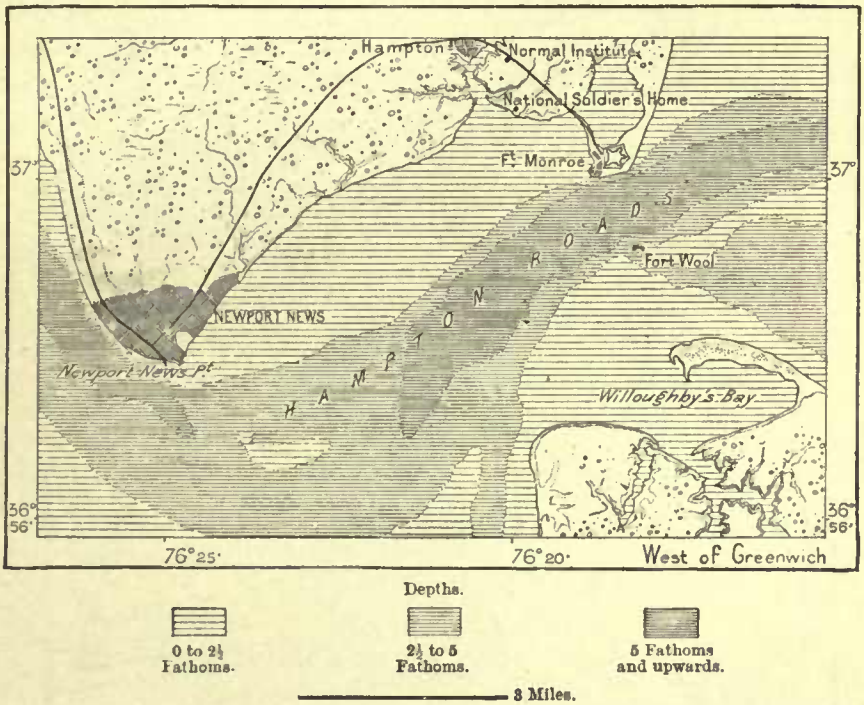
Nearly all the Alleghany valleys have one or more watering-places, that have sprung up round about the thermal springs. In Virginia, where they are most numerous, there are about thirty such stations, including *Warm Springs*, *Hot Springs*, *Healing Springs*, *Big Springs*, *Sulphur Springs*, and others with similar names. Near *Luray*, a post-town in the east Shenandoah valley, below *Harrisonburg*, and 90 miles in a bee-line from Richmond, there were lately discovered some remarkable caves, less extensive than the Kentucky Mammoth Cave, but of more varied aspect, and much more lofty.

The entrance of Chesapeake Bay and of all its lateral inlets and estuaries—Susquehanna, Potomac, Rappahannock, York, James, Appomattox—is of such strategic importance that it was thought necessary to defend it by a strong citadel, although the approaches are already sufficiently endangered by shifting sands and

treacherous currents. *Fort Monroe*, erected on York Peninsula, facing the entrance, is the seaward bulwark of a region with a population of over 3,000,000, and including the great cities of Baltimore and Washington, besides the Virginian capital. The maintenance of a strong Federal garrison at this point had a decisive influence on the vicissitudes and final issue of the Civil War. In the neighbouring Hampton Roads was fought the memorable battle between the *Merrimac* and the *Monitor*, the first ironclads ever engaged in actual combat (March 9th, 1862).

Fort Monroe, to which is attached a United States School of Artillery, is half encircled by a much-frequented bathing village, and in the neighbourhood has

Fig. 74.—Hampton Roads.
Scale 1 : 170,000.



been erected a vast asylum for veterans, with gardens, pleasure-grounds, park, and national cemetery.

The Federal Government has also made choice of this peninsula for the establishment of a technical school and of an agricultural college for the sons of emancipated negroes and young aborigines. The black students, to the number of about 500, work side by side with the 150 Indians in the workshops and in the fields in such perfect harmony that the teachers and tutors are never called upon to interfere. The young Indians, characteristically grave and dignified, ask no questions of anybody, but respectfully attend to their teachers' instructions, conducting themselves altogether like grown-up people. During the vacation most of the students go to work on distant farms, and several, after their training at Hampton College, continue their studies at some university.

Recently this part of the Virginian lowlands has witnessed the rapid develop-

ment of *Newport News*, an old settlement founded on the north side of Hampton Roads a little west of Fort Monroe. A railway company, which has its Atlantic terminus at this place, has here constructed some extensive harbour works, docks, shipyards, quays and warehouses, which have transformed this hitherto obscure station to a well-appointed seaport. In 1890 its shipping entered and cleared represented a total burden of over 266,000 tons, and in the same year the rising emporium exported agricultural produce to the value of $8,000,000.

Rival speculators have cast their eyes in the direction of *Chandler*, or *Yorkmouth*, with the view of also converting it into a great outlet for the produce of

Fig. 75.—Jamestown Island.

Scale 1 : 150,000.

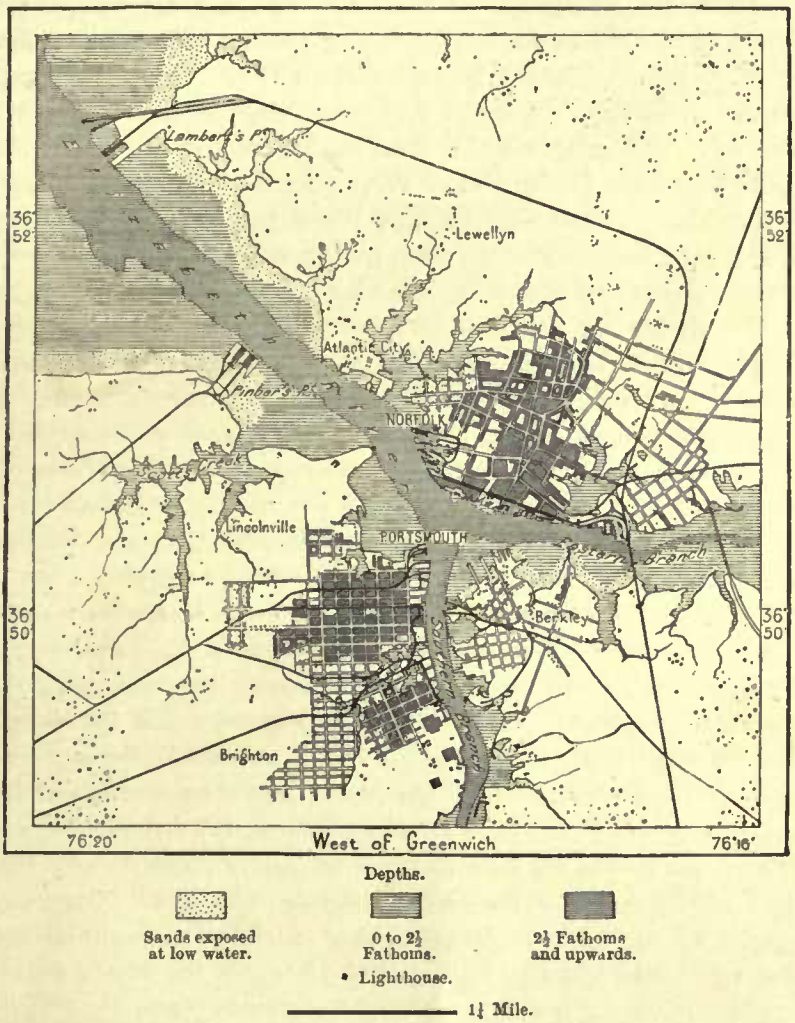
Virginia and surrounding states. Were this scheme carried out, the historic borough of Yorktown would soon recover its position, and even take its place among the flourishing cities of the Union. On the other hand, no one dreams of reviving *Jamestown*, which, though the first English settlement in Virginian territory, dating from the year 1607, was too unfavourably situated on its marshy island ever to acquire any expansion. Speaking of this very colony of Jamestown, Jefferson remarked, in his *Observations on Virginia*, that there are places where cities cannot arise.

Opposite Fort Monroe, on the south side of the James estuary, the ports of

Norfolk, *Portsmouth* and *Berkley*, separated from each other by the muddy and somewhat shallow marine inlets, or branches of the so-called Elizabeth River, constitute a cluster of towns whose collective population is exceeded only by that of the capital. Before the Civil War, Portsmouth was the chief United States naval station; but at present this group of towns possesses no importance except as commercial marts engaged in the export trade.

Nearly all the steamers entering Chesapeake Bay touch at Norfolk, which

Fig. 76.—Norfolk and Portsmouth.
Scale 1 : 70,000.



is also a harbour of refuge and port of call for the numerous fishing smacks engaged in the Chesapeake oyster industry. The rivalry of Newport News has not prevented Norfolk from also rapidly coming to the front during the last few years. The trade of Norfolk is much furthered by the Dismal Swamp and Albemarle and Chesapeake canals, the former of which extends from Norfolk through the swampy coastlands to the navigable river Pasquotank. Norfolk thus serves

as the outlet for the produce of the North Carolina lowlands, which have themselves no convenient seaward outlet, being separated from the Atlantic by narrow strips of surf-beaten sands.

14.—North Carolina.

North Carolina forms in its physical divisions a natural southern extension of Virginia along the Atlantic seaboard. Stretching, like the conterminous state, from the coast to the trans-Appalachian slope, it presents similar parallel zones, which are characterised by a corresponding diversity of soil, climate, and productions. But taken as a whole, North Carolina is less fertile and of less picturesque aspect than Virginia. Vast plains of ancient marine beds are covered with arid sands crossed by planked tracks and producing nothing but conifers; hence the title of the "Turpentine State" borne by North Carolina. On the east side a large part of the seaboard is occupied by swamps, sluggish backwaters, or muddy arms of the sea. This coast, with its three sandy points of Cape Hatteras, Cape Lookout and Cape Fear, is with that of Texas the most inhospitable in the Union.

Thanks to these natural disadvantages, North Carolina, though larger than Virginia, is greatly inferior in population, trade and the industries. Nevertheless its inhabitants, almost exclusively English, with some Scotch and Irish Celts, have by emigration during the first half of this century largely contributed to the peopling of Tennessee, Mississippi, and Texas. The system of small holdings has developed in North Carolina an energetic democracy of sturdy farmers.

Raleigh, the capital, is one of those places of secondary importance which have been chosen as the seats of the legislature on account of their central position. It has, moreover, the advantage of occupying one of the healthiest sites in the forest region. *Wilmington*, the most important city in the state, lies 133 miles south-east of the capital, not far from the coast, on the Cape Fear River, which, despite its dangers, is the point of easiest access from the sea. During the Civil War, Wilmington acquired considerable importance as the chief station visited by the blockade-runners, which here landed munitions of war and other supplies, taking in exchange cargoes of cotton for the Bermudas and Bahamas. This perilous trade was actively carried on till it was arrested by the capture of the forts defending the entrance of the Cape Fear. This river is navigated by small steamers plying between Wilmington and *Fayetteville*, 120 miles higher up.

In the western part of the state *Asheville*, with its orchards and fruit-gardens, occupies a central position in the heart of the Appalachians. It serves as the starting-point for mountain climbers visiting the lofty ranges culminating in Mitchell's High Peak. During the month of September the women and children collect in the surrounding forests the roots of the ginseng plant.

This Asheville district is the most remarkable in the Union for the surprising variety and brilliancy of its flora. In general the flowers are lovely and the fruits excellent. Grapes grow wild, and here also flourish the persimmon, the Chickasaw plum, the cranberry, yellow jessamine, the rhododendron, false vanilla, yawpan (yupon), akin to the maté (Paraguay tea), and the curious Venus's fly-trap (*Dionæa*), which entraps and digests small insects.

At the time of the enforced Cherokee emigration (1836-39), a small tribe succeeded in maintaining itself in the western extremity of the state, concealed in a remote valley of the Smoky Mountains, scarcely known to the whites. In 1890 this tribe, which had enjoyed some measure of prosperity, numbered 2,885 souls, of whom nearly one-half were full-blood Indians. The Government has now granted them a "reserve," to be held by the whole group collectively.

15.—South Carolina.

This region formed part of the original Carolina province from 1633 to 1729, when the two colonies of North and South Carolina were constituted. The first permanent settlement took place at Port Royal in 1670, and ten years later the same settlers established a station on the site of the present Charleston. The "Palmetto State," as it is called, was thus one of the thirteen original colonies, and took part in the War of Independence, though quite a number of its citizens were royalists and fought with the English army against the colonial forces.

A far more intense feeling prevailed when the Southern States attempted to sever the union and establish an independent confederacy ruled by the slave party. On this occasion Charleston took the initiative, and immediately after the election of President Lincoln South Carolina seceded. All the forts and arsenals belonging to the Federal Government in the state were seized, with the single exception of Fort Sumter, in Charleston Harbour, which remained for some months in the hands of the Northerners. Here occurred the first open conflict between the Northern and Southern forces.

South Carolina, which is of rough triangular shape wedged in between North Carolina and Georgia, presents the same natural features as the other cis-Appalachian states. Beyond a zone of low islands and swampy tracts fringing the coast, the land rises towards the foot of the Appalachians, while the mountains themselves, with their upland valleys, constitute another agricultural province.

The *Sea Islands* produce, though in small quantity, the famous long-staple cotton, the most highly prized in the world, while the best rice in the Union is grown on the swampy coastlands. But, as in other regions formerly cultivated by slave labour, the plantations have been to a great extent exhausted by a reckless system of tillage, and vast tracts now lie fallow.

The Civil War also spread like a devouring conflagration over these plains, destroying, expelling, or ruining the planters. A considerable portion of the land passed into the hands of Jewish money-lenders, and the total assessed valuation fell from $490,000,000 in 1860—of which $131,000,000 was real and $359,000,000 was personal property, largely slaves—to $150,000,000 in 1890, of which $88,000,000 was real and $62,000,000 personal and railroad property.

Of the abandoned plantations some are found to be extremely rich in the phosphatic lime-rock, which was formerly used only as road metal, but which has now acquired the greatest economic value as an excellent fertiliser of the exhausted soil. The mineral, which appears to be of remote animal origin, is found in a tract 1,200 square miles in extent, about the lowlands and river beds near

Charleston, and near St. Helena Sound. Here the yield averages about 1,400 tons the acre of pure phosphates, of which nearly 318,000 tons were exported from Charleston in the year 1889.

Some of the districts at the foot of the mountains abound in other treasures, including auriferous gravels, which have been profitably worked for the last half-century. Gold also occurs in reefs, while iron ores, copper, lead, manganese, and

Fig. 77.—Charleston.
Scale 1 : 135,000.

bismuth are found especially in the north-west; and elsewhere kaolin, red and yellow ochres and fine soapstone in abundance.

Before the Civil War the population of South Carolina included a large majority of blacks, about three-fifths of all the inhabitants. They still remain the most numerous element, and, aided by the Northern party, they for a time even acquired the political ascendency. But their triumph was of short duration; by means of threats, combined with a skilful manipulation of the laws, the whites have succeeded in completely recovering the political power.

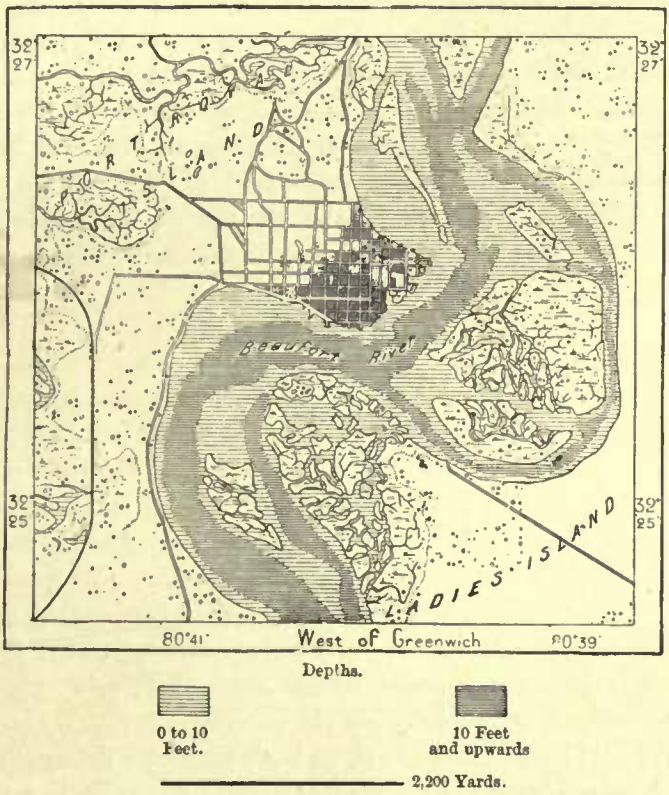
South Carolina has for official capital *Columbia*, a city of umbrageous magnolias and oaks, crowning a high bluff on the river Congaree, below the rapids. Other affluents converge on this watercourse, forming with it the Santee River, which

reaches the Atlantic north of *Charleston*. This city, constructed on a low peninsula surrounded by quays and promenades, is the metropolis of the state, and one of the historic cities of America. Its foundation dates from the year 1680, and from the first it became one of the centres of American commerce for the exportation of cotton and rice, and especially for the importation of slaves from the West Indies. During the War of Independence it was twice unsuccessfully attacked by the English fleet, and during the four years of the Civil War it was not taken by the Federal forces.

Charleston has also had to suffer from fires, floods, and earthquakes. But it

Fig. 78.—Beaufort.

Scale 1 : 60,000.



rapidly recovered from every fresh disaster, and in 1890 its foreign trade was valued at about $23,000,000. Charleston lies on a peninsula formed by the two broad estuaries of the Ashley and Cooper Rivers, which wash the city on the north and south sides, and then unite on the east side to form a perfectly safe and commodious harbour. This spacious basin communicates with the sea at Sullivan's Island, seven miles lower down; but although the two rivers have depths of from 30 to 40 feet, the entrance is obstructed by a tortuous sandbar, with not more than 10 feet at low water and 16 or 18 at the flow. For some years extensive harbour works have been in progress, including two converging piers, one projecting 4,600 feet from Sullivan's Island, the other 6,250 feet from

Morris Island on the south side. It is expected that the scour thus produced will have the effect of deepening the channel to over 20 feet at the bar.

The approaches are defended by several forts, such as *Castle Pinckney*, *Fort Ripley*, and *Fort Sumter* on islands in the harbour, and *Forts Moultrie* and *Johnson* on either side of the entrance.

Charleston, which covers the extremity of the peninsula for a distance of nearly four miles north and south, with an average breadth of one and one-half miles, is well laid out with many broad shady avenues running parallel with Cooper and Ashley Rivers, here 1,400 and 2,100 yards wide respectively.

Beaufort, in the archipelago of the Sea Islands, possesses an extensive group of excellent anchoring grounds comprised under the collective name of *Port Royal*, and affording ample accommodation for whole fleets. In recent years this place has become a serious rival of Charleston for the exportation of cotton and rice. It was in one of the Port Royal islands that the French Huguenots, under Ribault, made an attempt to found a colony. Here also the first English settlers established themselves in 1670, and declined to adopt the eccentric constitution framed by the philosopher, John Locke, which set up a nobility of landgraves and caciques under the colonial proprietors. This constitution lasted till 1729, when it was replaced by the Crown government.

16.—Georgia.

Georgia, one of the thirteen original states, is one of the most important of all those situated south of Mason and Dixon's line. It has already outstripped both Tennessee and Virginia in population, and thus earned the title of "Keystone of the South," which it claims as a set-off to Pennsylvania, "Keystone of the North." It occupies, in fact, an analogous geographical position, inasmuch as within its borders is comprised the divide between the waters flowing south and south-west to the Gulf of Mexico and south-east to the Atlantic. Its seaward frontage, however, is confined to the relatively narrow coastline between the mouths of the Savannah and Saint Mary's Rivers on the south-east side. On the south and south-west it is completely enclosed by the States of Florida and Alabama, so that in this direction it nowhere reaches the sea-coast.

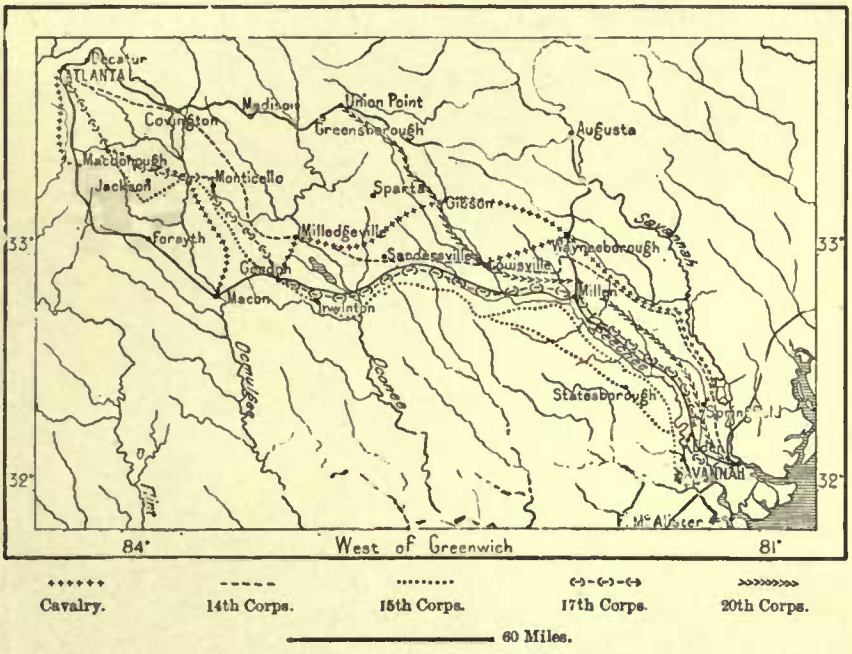
Georgia, which forms an inclined plane beginning with the terminal ridges of the Appalachians, and watered by numerous streams diverging like the ribs of a fan towards both seas, is one of the most fertile regions in North America, and before the Civil War enjoyed a large measure of material prosperity. Thanks to its great distance from the chief seat of the military operations between Washington and Richmond, it might have hoped to escape from the horrors of the struggle. But, on the contrary, of all the Southern regions it was exposed to the most widespread ruin, for it was across Georgian territory that Sherman led his devastating army in the campaign undertaken to cut in two the Confederate States. After several fierce conflicts for the possession of Atlanta in the north-western part of the state, the Federal army advanced in several parallel columns, burning the towns and farmsteads, ravaging the plains, destroying bridges and railways,

sweeping everything before it like an irresistible cyclone some 60 miles broad. The property destroyed during this terrible march was estimated at $400,000,000. Nevertheless, Georgia has already repaired her losses and even increased her population by one-half.

Although cotton and maize are the chief cultivated crops, the land yields an immense variety of other agricultural produce—wheat in the north-west, tobacco in the north, rice and some sugar-cane in the south, elsewhere sweet potatoes, market-garden produce, grapes and other fruits in great abundance. There are extensive grazing lands suited both for cattle and sheep farming; large herds of swine are also fattened, chiefly for the home consumption, and while the sea islands, as in South Carolina, yield the very finest long-staple cotton, the

Fig. 79.—Sherman's March.

Scale 1 : 8,500,000.



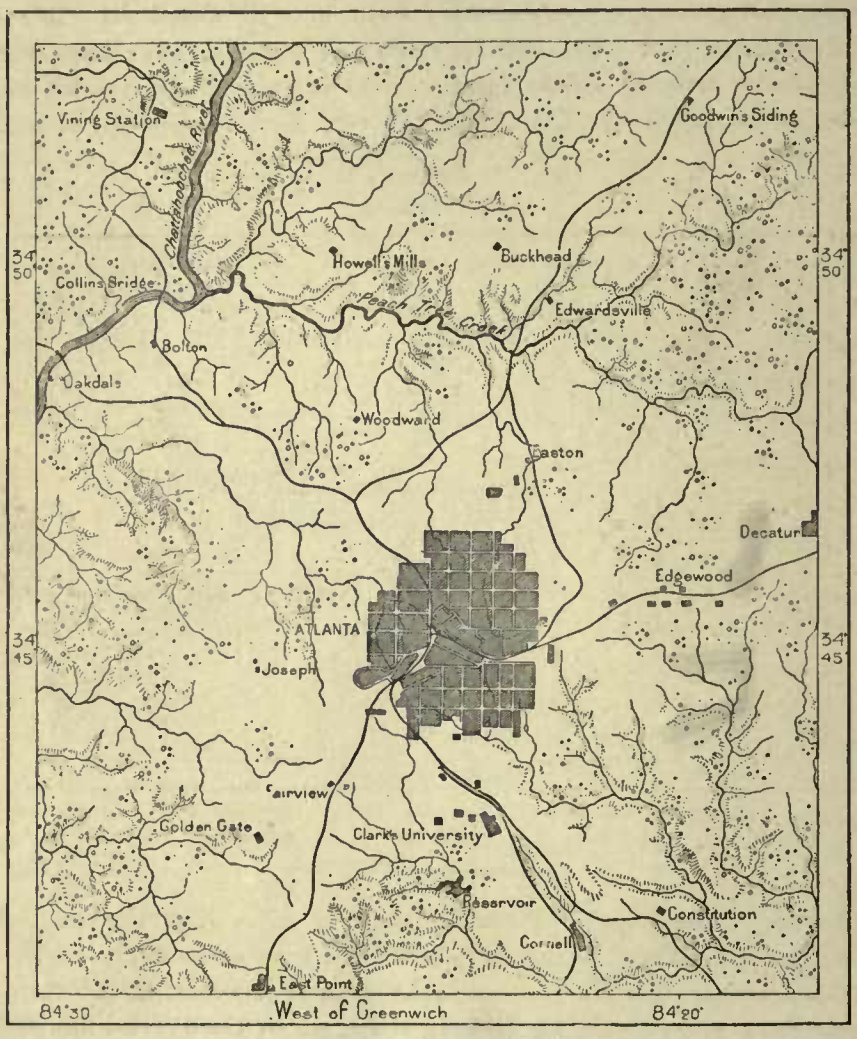
neighbouring "pine barrens," stretching some 60 miles from the coast inland, supply great quantities of lumber, turpentine, and naval stores of all sorts.

Atlanta, which since the War has been chosen as the state capital through a patriotic sense of gratitude for its long resistance to the Federal armies, does not occupy a central position like most of the other seats of state legislation. But, as was sufficiently shown by Sherman's campaign, it is the true strategic centre of Georgia. Jointly with Chattanooga, it holds the key of all the states comprised between the Atlantic, the Ohio, the Mississippi, and the Gulf of Mexico; hence its title of the "Gate City." Standing at an altitude of over 1,000 feet above sea-level, Atlanta commands all the southern passes of the Appalachians as well as the headwaters of all the streams diverging from this hydrographic centre towards the Mississippi, the Gulf of Mexico, and the Atlantic waters. This

vital strategic importance is increased by the numerous trunk lines of railway converging on Atlanta, which has already become the most populous city of Georgia, although the first settlements date only from the year 1840.

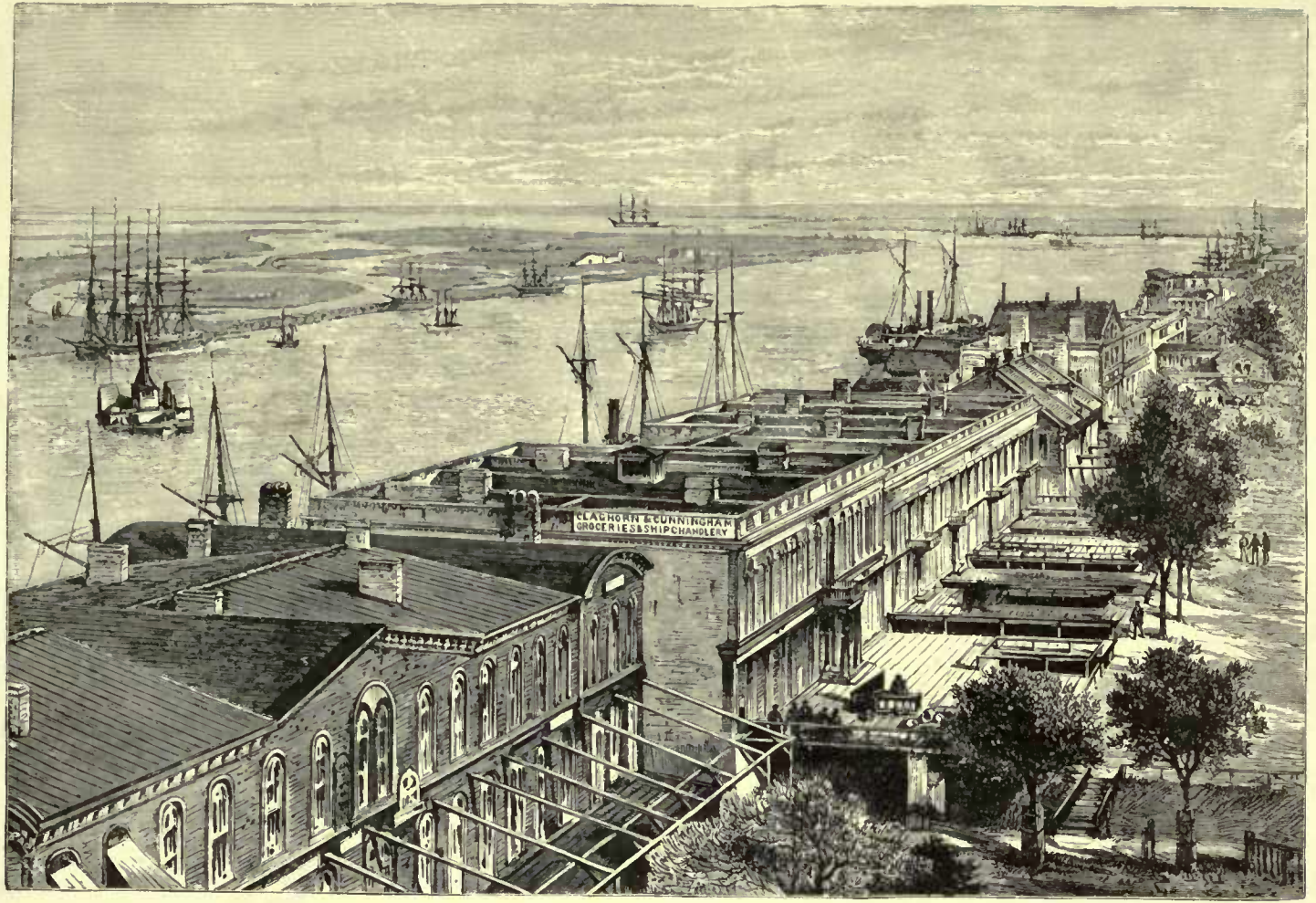
About 12 miles north-east of Atlanta stands the so-called Stone Mountain, a huge granite mass supposed to be the Mount Olaimi of the Creek Indians.

Fig. 80.—Atlanta.
Scale 1 : 180,000.



The upper plateau, about 900 yards in circumference, is enclosed by a wall, probably the remains of an ancient fortress.

Till recently the position of state capital was contested with Atlanta by two other cities, *Macon* on the Ocmulgee, and *Milledgeville* on the Oconee, both near the geometrical centre of the state. Like *Columbus* on the Chattahoochee, these places have sprung up on the spot where the rivers descend in rapids from their upper valleys, and where they begin to become navigable.



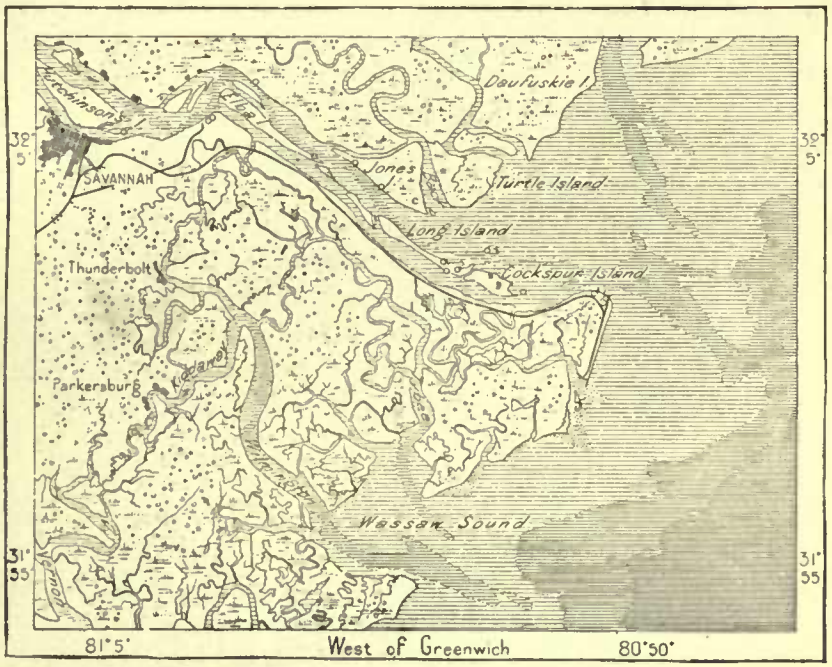
GENERAL VIEW OF SAVANNAH.

Augusta, on the right bank of the Savannah, opposite *Hamburg*, in South Carolina, occupies a similar position at a point where the rapids, with a total fall of 40 feet, supply driving power to the neighbouring cotton-mills, flour-mills, foundries, and other factories.

Savannah, which was long the largest city in Georgia, and which still remains its chief commercial centre, lies on the south side of the Savannah River, which here develops a broad estuary about 25 miles long. Savannah, which was founded in 1733 by General Oglethorpe, and chartered as a city in 1789, is well

Fig. 81.—Savannah.

Scale 1 : 330,000.



laid out with spacious avenues closely planted with shady trees; hence the title of "Forest City," which it shares with Cleveland and some others.

The river is navigable for steamers to Augusta, and the harbour, one of the best on the south coast, is accessible to vessels drawing 20 feet. Thanks to these advantages the trade of Savannah has already far surpassed that of Charleston, the exports, chiefly cotton and rice, being valued at $33,500,000 in 1890.

The other seaports, which follow southwards along the Georgian seaboard, are all of dangerous access, but are none the less frequented by numerous craft engaged in fishing and the coast trade. The best of these ports is *Brunswick*, on St. Simon's Island.

17.—Florida.

The present State of Florida is a mere remnant of the vast territory of the "Floridas," which formerly extended round the Gulf of Mexico, westwards to the Mississippi delta. But as now constituted, it has the advantage of forming a distinct geographical region. It projects abruptly from the mainland in the direction of the West Indies, which its southern extremity resembles in its geological constitution and climate, as well as its flora and even its fauna.

Nor did Florida form part of the original Anglo-American domain, having been purchased from Spain so recently as the year 1819. Its progress in population and wealth also has not kept pace with that of the northern and central states. Settlement has been greatly retarded by the lagoons, backwaters, and swamps, which cover vast tracts, especially in the southern part of the peninsula. Even in the drier districts the agricultural settlers from the north were long discouraged by the obstacles opposed to tillage by the widely diffused dwarf palms, which are with difficulty uprooted, even by the plough.

Lastly a great obstacle to the progress of agriculture has been created by the vast concessions of lands that had been made to various distinguished personages under the Spanish administration, concessions which were afterwards ratified by the United States Government. A considerable extent of the best lands has thus been monopolised by foreigners who are absentees, not only not residing on their estates, but for the most part either leaving them uncultivated or else renting them to rapacious syndicates.

Yet despite all these serious drawbacks, the population of Florida—three-fifths white and two-fifths coloured—has more than doubled since the Civil War. Certain agricultural industries, also, amongst others the production of oranges and early vegetables, have given the country an increasing economic importance.

On the Florida mainland the chief city is *Jacksonville*, port of entry of the Saint John River, and centre of attraction for invalids and for sportsmen attracted to the lakes and woodlands of the interior, which afford excellent fishing and hunting. The harbour is unfortunately of difficult access, being obstructed by a bar which has scarcely more than three feet at low water. Converging piers are now being constructed for the purpose of deepening the passage to 14 or 15 feet.

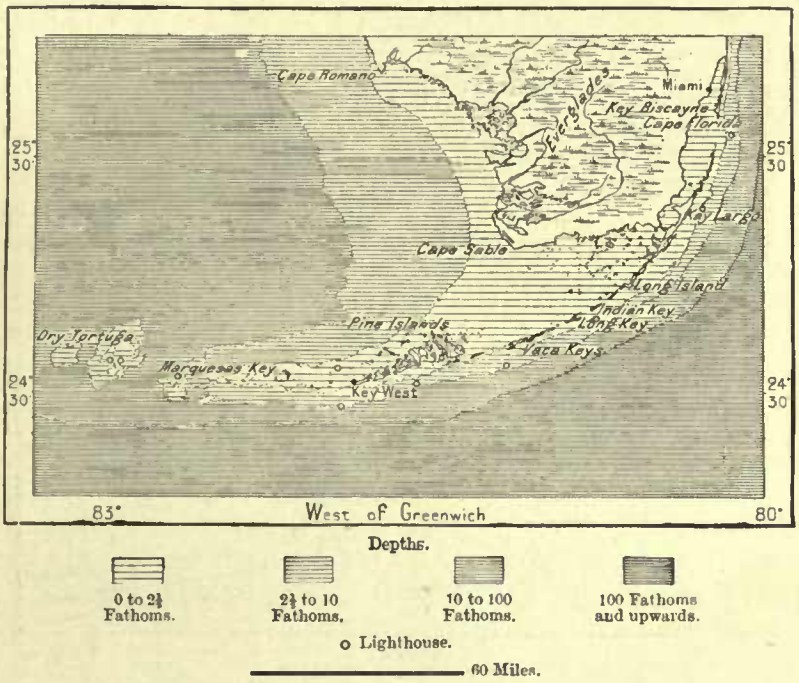
Steamboats ascend the Saint John for a distance of 150 miles to *Sanford*, on Lake Monroe, while smaller vessels ascend to Lake Florence, 150 miles farther. The river itself is rather a "chain of lakes" connected by channels, as indicated by its Indian name, Wi-la-ka. One of these lakes has received the appellation of Lake George, from its resemblance to the marvellous lacustrine basin in the state of New York, and its umbrageous shores are yearly visited by thousands of strangers. Higher up, the *Silver Spring*, which flows through the Ocklawaha to the Saint John, near Palatka, develops near its source in the limestone rock a basin 200 yards wide, and so wonderfully clear that its sandy bed is visible at a depth of nearly 70 feet. Through its outlet, which is accessible to large river

craft, this basin discharges the prodigious quantity of about 560 cubic feet per second, the water maintaining a uniform temperature of 50° Fahr.*

Like Jacksonville, *Saint Augustine*, which lies farther south on the Atlantic coast, is surrounded by orange-groves. This is the *San Agostin* of the first Spanish colonists, the oldest European settlement in any part of the United States. It dates from the year 1564, but even before that time the site had already been for ages occupied by Indians, for the whites built their dwellings on enormous shell-mounds, and other heaps of kitchen refuse rising nearly 14 feet above sea-level. Since then, however, these mounds have subsided, so that the city has now to be protected against the erosive action of the waves by a broad sea-wall which forms the chief public promenade.

Fig. 82.—The Florida Reefs.

Scale 1 : 3,500,000.



Farther south the Florida seaboard for a distance of 370 miles to its extreme point at Cape Sable has not a single large town, nothing but a few villages and some lighthouses and little havens of refuge. The whole of this seaboard, however, is being prepared for settlement and for transformation to a vast garden by the draining of the marshes, and this work has already been greatly advanced by the construction of a canal running in the direction of the Caloosahatchee, which flows to the Gulf of Mexico.

A few Seminole Indians, who escaped the wholesale transportation of 1842, still survive in over twenty camping-grounds, in the islets and on the margin of the Everglades (Pai Oki, or "Grassy Lake") in the southern part of the

* D. C. Brinton, *Guidebook to Florida.*

peninsula. They are prosperous farmers and craftsmen, prepare starch, flour and tapioca from the root of the *koouti*, and dress hides, forwarding their produce through the neighbouring little port of *Miami*, and importing for their own use stoves, sewing-machines, pianos, timepieces, and the like. Numerous mounds and barrows scattered over the inland plains and heaps of shell-mounds along the sea-shore show that the country was formerly thickly peopled.

The citadel, guarding the channels through which the Atlantic communicates with the Gulf of Mexico, has been erected on the islet of *Key West*, in the chain of reefs continuing the east coast of Florida as far as the Marquesas and Tortugas.

Fig. 83.—Key West.
Scale 1 : 100,000.

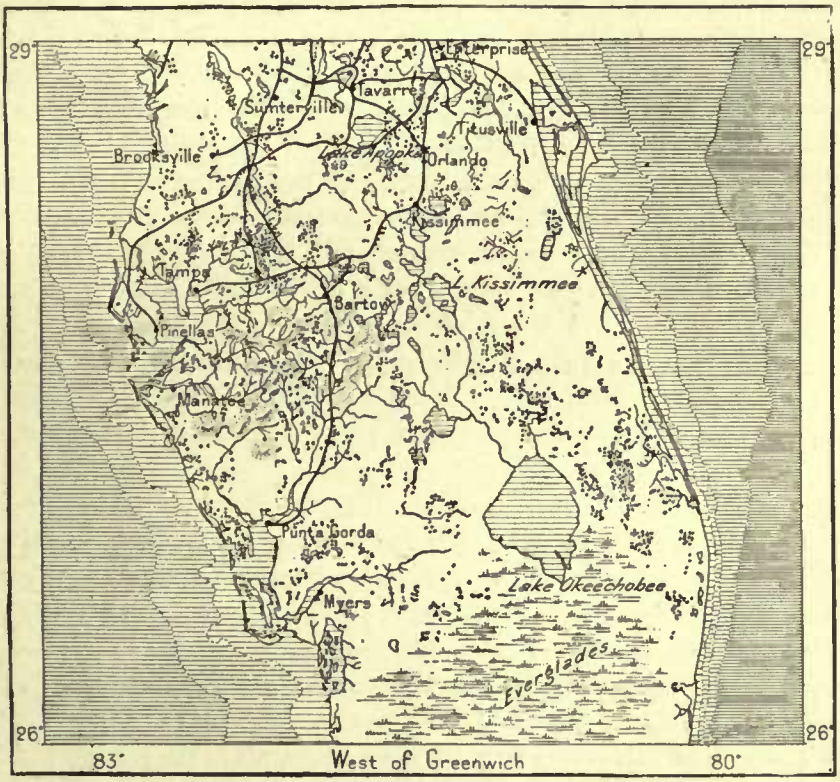
Key West is the Cayo Hueso, that is, "Key of the Bone" of the Spaniards, so named from its rocks looking like bleached animal remains. The islet, which is only five by two miles, rises not more than 18 or 20 feet above the main level of the sea. Nevertheless, a considerable town has sprung up on this reef almost awash with the waves.

Key West has the advantage of possessing an excellent well-sheltered haven, accessible to vessels drawing from 20 to 23 feet. Thanks also to its commanding position between two seas, it has become the natural port of call for most of the lines of steamers plying to and fro in the track of the Gulf Stream through

Florida Passage. Lying over against Havana, with which it is connected by a submarine cable, Key West shares in the trade of the great Spanish city, and in 1890 the burden of the ships entering and clearing its port exceeded 280,000 tons. It also resembles the Cuban capital in its pleasant villas nestling in the shade of palms, magnolias, mangos and other tropical growths. The Cubans form a considerable section of the population, Key West being for them a place of refuge and a centre of propaganda for those expelled from the Spanish Antilles.

Fig. 84.—The Lacustrine Region, Florida.

Scale 1 : 3,500,000.



The Cuban refugees have introduced the cigar industry, which has acquired a great development in Key West. During the Civil War this vitally important station was held throughout by the Federal fleet, and served as the chief base in keeping up the blockade of the Southern States.

The low-lying west coast, being obstructed by reefs and shoals, presents only a few ports accessible to vessels of heavy draught. One of the least dangerous, used especially for the export trade of cattle to Cuba, is *Tampa*, an old Spanish settlement, which had long been abandoned. Here converge all the

chief roads from the remarkable region of countless lakes in the interior of the peninsula.

Tampa, which stands at the mouth of the Hillsborough River, on the east side of the spacious and navigable Tampa Bay, lies about 100 miles south by east of *Cedar Keys*, the principal distributing point for the west coast of Florida. This station lies near the mouth of the Suwanee, which rises 45 miles higher up at Manatee Spring, so named from the large cetaceans (*Trichecus manatus*) which formerly frequented the wooded shores of its blue waters. The remains of these marine mammals may still be seen half covered by the sands and sediment. Engineers have discussed the question of constructing a navigable maritime canal at the root of the peninsula between Cedar Keys and *Fernandina*, at the mouth of the Saint Mary's River on the Atlantic side. Such a canal, which would be about 137 miles long, would enable vessels plying between New Orleans and New York to avoid a détour of 560 miles round the peninsula in extremely dangerous waters studded with islets, reefs, and keys. The annual shipwrecks on these treacherous coasts represent an average loss of about $5,000,000.

In West Florida the old Spanish settlement of *San Marco* (*Saint Mark's*) has been a mere ruin since the year 1704, when a British force, aided by a band of Alibamon Indians, captured the fortress, and put to the sword or reduced to slavery the Appalachian Indians, who were settled here under the control of Spanish missionaries. Saint Mark's is the natural port of *Tallahassee*, capital of Florida, and of a vast well-watered region, which might easily be transformed to a lovely garden.

Near the Saint Mark's River, some 12 miles south of Tallahassee, well up from a depth of 100 feet the cold, pure waters of the copious Wakulla. This river, flowing to an arm of Appalachee Bay, is the lower course of the Alachua, which some distance higher up plunges into a yawning chasm, and then reappears as the Wakulla. Wakulla, Silver Spring, and Manatee Spring are the three marvellous waters of Florida, supposed to be those long sought by the Spaniards, who hoped in them to find the fabled "fountain of rejuvenescence."

But the trade of this region is gravitating westwards to the port of *Pensacola*, which lies on the west side of Pensacola Bay, 10 miles from the Gulf of Mexico, near the Alabama frontier. Like Key West, Pensacola is a military station, although the United States navy-yard is at *Warrington*, seven miles nearer the gulf; both the Spaniards and the French utilised it as such since the year 1693, and during the frontier wars the place was frequently attacked and captured. The harbour, which is sheltered from all winds, and accessible to vessels drawing 20 feet, is one of the very best on the Gulf of Mexico; hence the great strategic importance of Pensacola.

Since the Civil War, and especially since the development of the coal and iron mining industries in Alabama, Pensacola, which is connected by rail with the central states, has also become a flourishing trading-place. Till recently the only export was lumber; now it forwards the pig-iron of Alabama and Tennessee, and it has become the chief outlet for the produce of Birmingham,

mining and iron manufacturing emporium of the South. In 1890 the shipping cleared and entered represented a total burden of 676,000 tons. The approaches to the harbour are defended by *Forts Pickens* and *McRae*.

Fig. 85.—Banks of the Silver Spring, Florida.

Appalachicola, which perpetuates the name formerly borne by the capital of the Palatzi or Appalachee nation, stands at the mouth of the River Appa-

lachicola, on the Gulf of Mexico, about 80 miles south-west of Tallahassee, close to Cape San Blas. The river is the lower course of the Chattahoochee, which recalls the presence of the Uches, an Indian nation allied to the Creeks but speaking a fundamentally distinct language.

The village of *Chattahoochee*, situated on the Appalachicola, near the Flint

Fig. 86.—Pensacola.
Scale 1 : 150,000.

and Chattahoochee confluents, stands on the site of the old Indian town of *Chata-houche*. This place was described by Bartram * as the largest of all Indian towns, with wood houses plastered with mud and roofed with cypress shingles.

* *Travels through North and South Carolina.*

CHAPTER V.

THE GREAT LAKES AND MISSISSIPPI BASIN.

I.—Relief of the Land.

F the three great physical divisions of the United States, by far the most extensive is the natural region which forms part of the North American central depression between the Frozen Ocean and Gulf of Mexico. The Alleghanies and Rockies, which form its two outer rims, enclose a space with an average diameter of about 950 miles in all directions, comprising about three-fifths of the superficial area of the whole Union exclusive of Alaska.

This vast region is far from uniformly inhabited, and immense tracts, especially on the trans-Mississippi plains, being insufficiently watered either by streams or by precipitation, are available only for cattle grazing. But nearly the whole of the cis-Mississippi states, the Louisiana delta, and the lands stretching westwards along the middle course of the Missouri and its affluents, are endowed with marvellous natural resources. In this prodigious field of human enterprise hundreds of millions of people might easily find the means of support.

The exceptional advantage of these regions consists in the extreme facility of the communications. Even before the development of the railway system, the Mississippi basin and the Great Lakes offered to the colonists a network of natural highways superior to anything of the kind elsewhere found in any of the most favoured lands of the globe. To these navigable routes have now been added the innumerable railroads, whose connections are yearly becoming more and more complete. Traffic springs up in regions till recently desert, and large cities rise like a mirage in the midst of the solitudes. Although the Federal capital, and the most populous cluster of urban populations—New York, Brooklyn, and Jersey City—are found on the Atlantic slope, more than half the inhabitants of the Union have already crossed the Alleghanies and settled in the Mississippi basin, and from year to year the numerical disparity increases, to the advantage of this central section of the Commonwealth.

Between the two mountainous escarpments of the great plain there is almost a complete absence of prominent rising grounds. On its west side the Appalachian system is flanked only by foot-hills of moderate elevation, which in certain places develop continuous ridges, while elsewhere the surface presents nothing but

slight undulations, or is broken by a few rounded eminences. This hilly western region, less folded and fractured than the eastern slope facing the Atlantic, consists of rocks containing bituminous coal, natural gases, oils, salt, iron ores, much of the mineral wealth of Pennsylvania and Ohio.

In the Ohio basin itself the chief prominence consists of a long, broad swelling designated by geologists the Cincinnati Axis, because the metropolis of Ohio lies in its track. These heights are connected with the crest of the waterparting which skirts the southern shore of Lake Erie and which trends thence south-westwards parallel with the Alleghanies. But in their general aspect they differ but slightly from the other rugosities of the surface, while the system is in places effaced by the intersecting lateral valleys.

Beyond the Wabash the prairies, which are distinguished from the eastern regions by the predominance of a herbaceous vegetation, are altogether destitute of hills beyond those long rolling swells that have been compared to the ocean billows. The foldings, often imperceptible to the eye, correspond to the trough between the waves of deep water; they are formed always above the sources of the rivers and gradually deepen in the direction of the slopes.

West of the Alleghanies, properly so-called, towards the headwaters of the Green River in Kentucky, the carboniferous limestone strata assume the aspect of rolling plains overlaid by thin layers of sandstone and vegetable humus. These formations, which are pierced by numerous galleries, are continued south of Kentucky into Tennessee, where, however, they are less extensive. West of the plateau known as the Cumberland Mountains, which still form part of the Appalachian system, though separated from it by the deep parallel valleys of the Upper Tennessee and its affluents, the ground falls and towards the centre of the state breaks into irregular undulations. This uneven ground has been designated by the name of "Highlands," although its mean altitude does not exceed 1,000 feet.

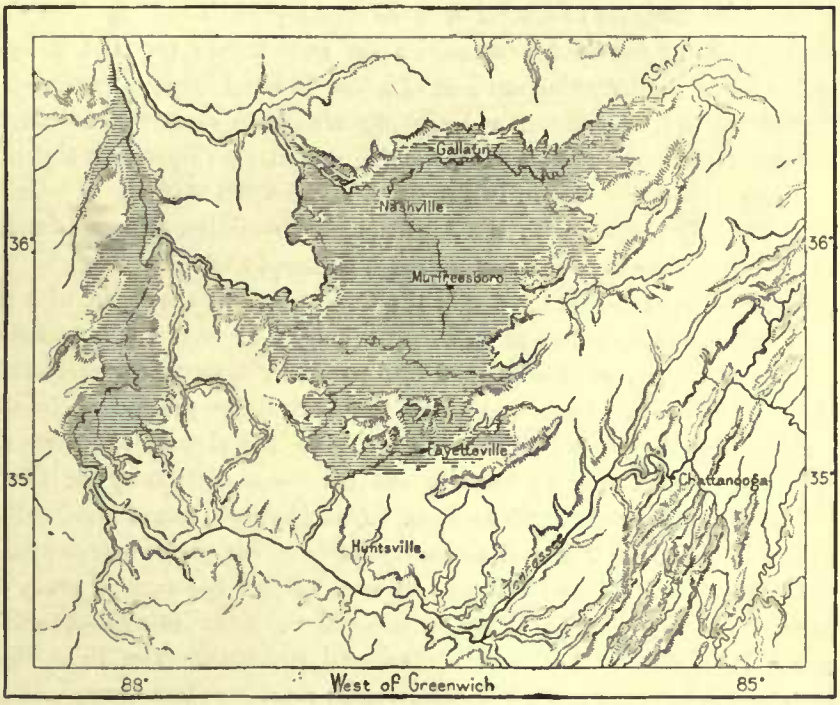
The "Great Basin" of Tennessee, as this region is called, has a superficial area of about 6,000 square miles, and appears at some remote epoch to have formed the bed of a lake. It presents all the outlines of a lacustrine depression, with its creeks, inlets, shores, capes and sandy points, while the alluvia filling all the troughs and cavities make it the most fertile tract in the whole country. Towards the south a region of elevated plains, presenting the same undulating ground as the prairies of Illinois, stretches over the slope of the Tombigbee valley.

The zone of limestone formation limiting the Great Basin on the east is deflected southwards parallel with the course of the Tennessee River, and merges westwards in another region of highlands even less elevated than the first, standing at a mean altitude of scarcely more than 650 feet above sea-level. This elevated plain, which is overlaid with strata of Tertiary origin, inclines towards the west and terminates abruptly in the line of bluffs which skirts the alluvial winding valley of the Mississippi at a height ranging from 70 to 200 feet. As the great river itself here flows at an elevation of about 182 feet (extreme low water) above the sea, the crests of the highest cliffs skirting the east side of its valley have an absolute height of about 350 feet.

The bluffs evidently represent former banks eroded by the river at a time when it sent down a volume of water far greater than at present. They consist of sandy beds underlying clays, with traces of lignites, and higher up of ferruginous gravels thinly covered with grey or yellowish argillaceous formations enclosing calcareous concretions and in places the remains of huge mammals now extinct. This formation is analogous to that of the loess on the banks of the Rhine and in the vast plains of the Hoang-Ho in North China.

Between the great river and the base of the Rocky Mountains the surface of the land presents a far more uniformly inclined plane than on the east side of the Mississippi. In certain parts of this region the slope is so gentle that the

Fig 87.—Great Silurian Basin, Tennessee.
Scale 1 : 3,500,000.



ground seems perfectly level. In the northern districts the plain is now known to be interrupted by terraces or successive step formations, rising continuously from the central level to the base of the Rockies, but much more distinctly marked in British North America than in the United States. The Coteau des Prairies, as the first rise was called by the Franco-Canadian pioneers, is extremely irregular, and dominates the Minnesota Valley at a height of 800 feet.

The second terrace, separated from the first by the valley of the James or Dakota River, presents a continuous escarpment of some 600 miles, consisting below of the clays and sands deposited by the waters before their subsidence, above of the drift gravels left by the ice-cap after its retreat. This is the Coteau du Missouri, so named from the river which accompanies it on the west side.

For a distance of nearly 700 miles from Laurentian mountains Dawson has discovered erratic boulders derived from those Canadian uplands. The first explorers often wrongly described some of these "coteaux" as volcanoes. The smoke enveloping the slopes, the sulphurous odour filling the atmosphere, the scoriæ of burnt clays met in many places, proceed not from the eruption of lavas, but from the combustion of the lignites contained in these formations. On the other hand the pumice which is found floating down the Missouri as far as and beyond Omaha, is brought from the distant Rocky Mountains.

The layers of combustibles, almost everywhere horizontal, may be followed by the eye along the slope as clearly as if painted with a brush. Ignited at some unknown period, they continue slowly to smoulder, gradually charring the soil and transforming it to a sort of pozzuolan; hence the term "Côtes Brûlées," applied by the Canadian trappers to several of these smoking hills.

In the midst of the boundless prairies the monotonous prospect is here and there relieved by the irregular outlines of a few isolated heights or ridges. But none are developed in sufficiently large proportions to constitute a distinct orographic system except the Ozark Mountains, which are disposed in the direction from south-west to north-east in Indian Territory and the State of Missouri. The range runs mainly parallel with the Appalachian Mountains, although its outlines are far more irregular than those of the cis-Mississippi chains.

Towards their south-west extremity the Ozarks present the aspect of a ravined plateau, surmounted by crests at an average height of from 1,000 to 1,300 feet. But farther north they are decomposed into parallel ridges, whose peaks attain an altitude of 2,000 feet. Here and there the crystalline granite nucleus is seen cropping out above the paleozoic rocks covering the slopes. The remarkable ferruginous masses occurring towards the north-east extremity of the Ozark Mountains appear to be of eruptive origin. *Iron Mountain*, one of these eminences, although not more than 230 feet above the surrounding plain, represented, when discovered, a mass of 230,000,000 tons of ore. Below the surface every yard of thickness, even supposing the slopes to descend vertically into the bowels of the earth, would add 3,000,000 tons to these mineral treasures. The Pilot Knob was considerably higher (580 feet), but the mineral mass was less homogeneous, iron ores alternating with layers of slates. Both mountains were formerly regarded as inexhaustible; yet they are now but little worked, nearly all the best ores having already been smelted. To the south-west on the northern slopes of the Ozarks in Missouri and south-eastern Kansas, lead is also mined and smelted in considerable quantities.

In a line with the Ozarks other heights of irregular outline collectively designated by the name of the Wichita Mountains, traverse Indian Territory and Arkansas. Like the Ozarks these heights have a hard nucleus on which are overlaid Silurian beds. Some of the Wichita masses are disposed in separate ridges, while others assume the aspect of plateaux similar to those of Texas, from which they are separated by the valley of the Red River.

These Texan uplands on their part are not continued uniformly without

relief over vast space. They also are disposed in a line with the Ozarks and Wichitas, and present groups of heights, and even isolated cones, rising like volcanic islands above the waters. The space, slightly inclined from west to east, between the Rocky Mountains, the Texan plateaux, the Wichitas, Ozarks, and northern Black Hills, foot-hills of the Rockies, was formerly occupied by one or more lacustrine depressions, of which numerous traces still survive.

The greater part of Texas consists of plateaux, which follow in vast terrace formations from the banks of the Rio Pecos to the Gulf of Mexico. The upper terrace, abruptly escarped on the side facing the river, attains in its western sections an altitude of nearly 5,000 feet, and slopes gently towards the south and east. Its lower scarp still stands at a mean height of about 3,000 feet above the second terrace. Viewed as a whole it presents the aspect of a prodigious sandstone block, with slightly rolling surface, and destitute of fissures or deep ravines.

The vast plateau, some 27,000 square miles in extent, is uninterrupted by a single fluvial valley. Fearing to lose their bearings in this boundless solitude, the first Spanish explorers erected posts as landmarks, at intervals, to indicate the directions to be followed between the pools of water, the wells and patches of herbage. Hence the name of *Llano Estacado*, "Staked Plain," given to the whole of this desert region.

The second terrace, standing at a mean altitude of about 2,000 feet, and, like the Llano Estacado, formed of Secondary strata, presents a more diversified aspect than the first. The streams that here have their rise carve it into several parallel valleys, with a south-easterly trend at right angles with the coast. Belts of arborescent vegetation fringe the banks of the watercourses, while the intermediate spaces offer a little sparse verdure.

The third terrace, with a mean elevation of 600 or 700 feet, already forms part of the zone of Tertiary rocks: it was uniformly covered by a grassy carpet before the planters came and brought much of the ground under cultivation.

Farther down the alluvial zone of the present seaboard forms the lowest level in this prodigious flight of steps.

A considerable portion of Texas and of Oklahoma Territory, especially within the limits of the Staked Plain, is covered with a continuous layer of gypsum, probably the most extensive in the whole world. It is estimated to have a length of 370 miles and a breadth of 200 miles, a territory larger than the whole of England and Wales, with a thickness of over 5,000 feet. In many places this absolutely inexhaustible deposit of gypsum assumes the form of transparent alabaster; elsewhere it takes the character of crystalline selenite. It also occurs veined and striated in diverse colours derived from metallic oxides. The streams that have eroded the plateau have carved it into cone-shaped knolls, each surmounted by a cake of gypseous rocks, with vertical sides.

II.—Ancient Glaciers, Lakes, and Rivers.

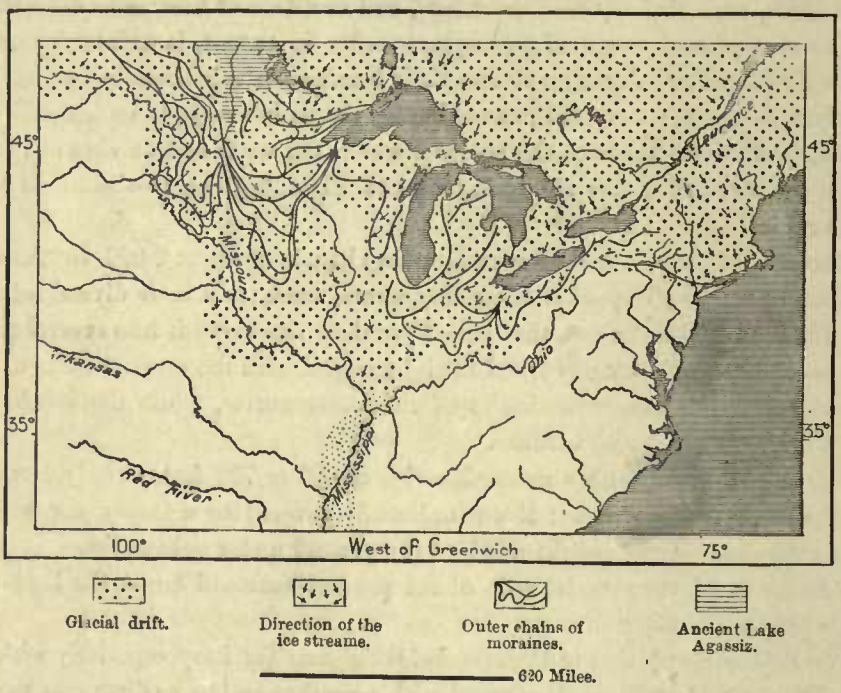
The geographical features of the shores of the Great Lakes, and of the Upper Mississippi valleys, have been profoundly modified by glaciation. Lakes have

changed their form; rivers have shifted their courses; water-partings have been displaced; all nature has been remodelled; yet under the present relief it is still possible in many places to recognise the former aspect of land and water.

South of Lakes Ontario and Erie the edge of the glacial drift, disposed about parallel with the southern shores of the lakes, trends first south-westwards, then bending round to the south, crosses the Ohio River a short distance above the spot where now stands the city of Cincinnati. Glacial muds and erratic boulders are met in northern Kentucky, from 500 to 600 feet above the bed of the Ohio. But east of Louisville the lower edge of the glacial drift is again deflected northwards to the Wabash Valley, and then describes a great bend in

Fig. 88.—Regions formerly covered by the Northern Ice-Cap.

Scale 1 : 30,000,000.



the southern part of Illinois, crossing the Mississippi below Saint Louis and embracing the whole of the Missouri Valley.

As in New England, the State of New York and North Pennsylvania, the traces of the former presence of ice are easily detected; such are the scratched surface of the rocks, erratic boulders, frontal and lateral moraines, kames, drumlins, lakes, and kettleholes. In certain districts of Minnesota and Wisconsin such is the aspect of the land that the melting of the ice-cap might seem to be quite a recent phenomenon. Certain freshwater lakes with the granite blocks strewn over their margin, and the lower moraine still damming them up, look almost as if they were but yesterday filled with ice.

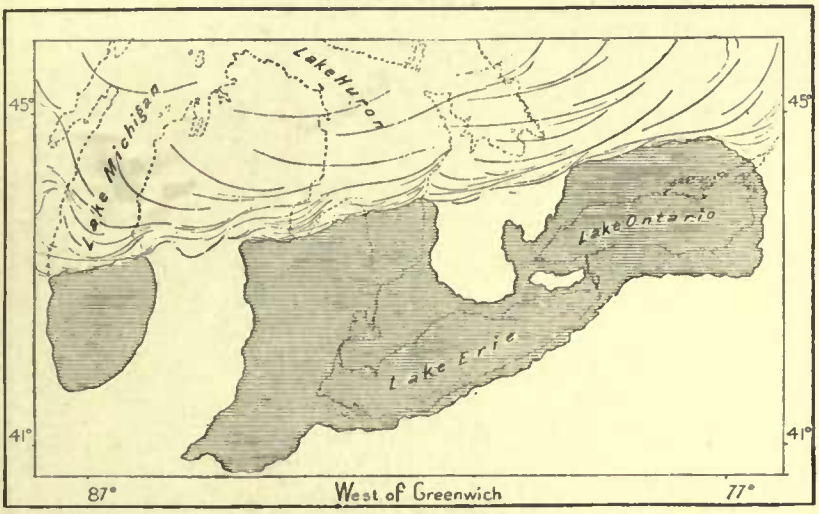
As they advanced southwards the frozen masses drove before them the fluid contents of the lakes that filled the cavities caused by the folding

or cracking of the crust of the earth. Thus various indications have enabled geologists to reconstruct a map of the epoch when the front of the glacier filling the northern half of the basins flooded by Lakes Huron and Michigan, had pressed southwards the two united sheets of Erie and Ontario. Collectively these inland seas, which already existed long before the Glacial Epoch, and which were inhabited in their lower depths by organisms of marine origin, formed a sheet of water more extensive than the present Lake Superior.

Farther south stretched another scarcely inferior lacustrine basin, a basin formed by the damming up of the Ohio at the point where now stands the city of Cincinnati. Pent up by this prodigious barrier of ice and rocks, the running waters accumulated back of the obstacle, penetrating into the lateral valleys, and transforming them to bays and inlets. At the spot where at present the waters

Fig. 89.—Old Lake Erie-Ontario.

Scale 1 : 10,000 000.



of the Alleghany and Monongahela converge to form the Ohio, the lake, 1,000 feet deep, filled the valley to the crest of the fringing hills.

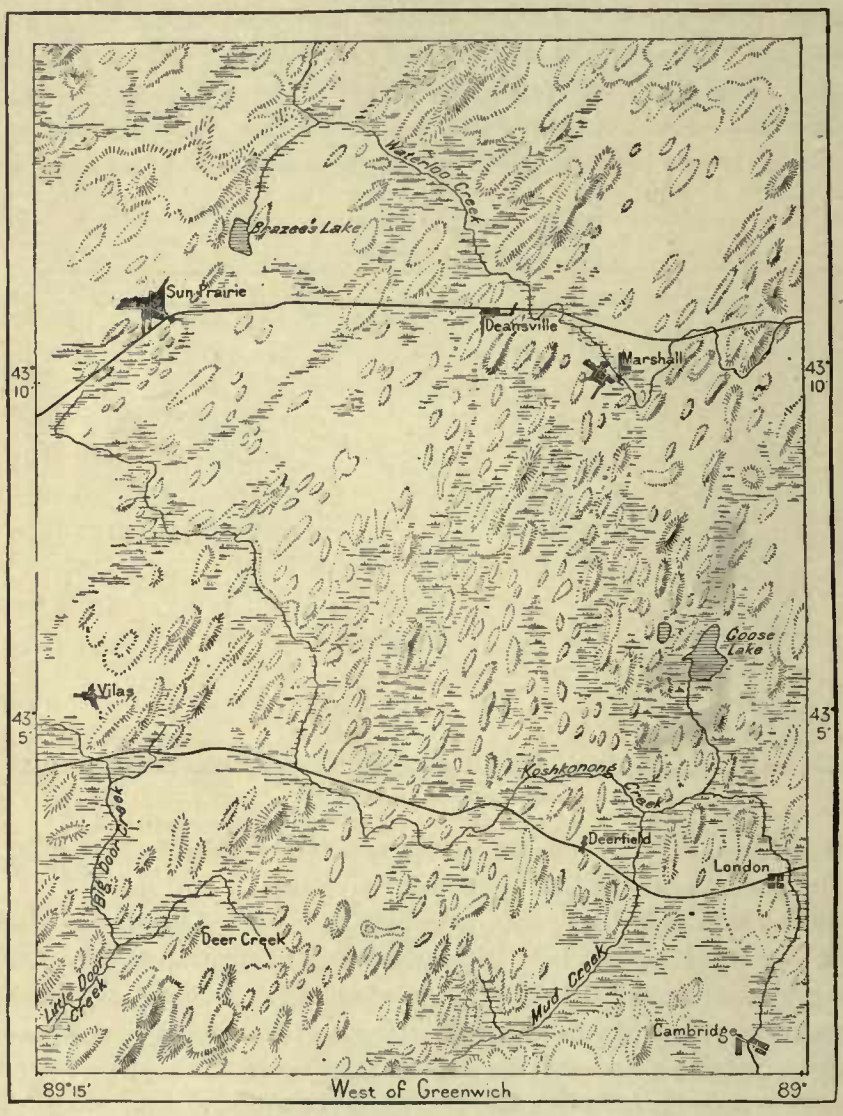
According to Wright the margins may be followed round nearly the whole of the periphery of this ancient Lake Ohio, which may be reconstructed in thought. But the geological transition from the lacustrine to the fluvial condition of the Ohio was perhaps somewhat protracted, owing to the ebb and flow of the ice itself, now advancing southwards far into the interior of Kentucky, now retreating northwards sufficiently to leave a free passage to the outflow.

By an effort of the imagination we may conceive the overwhelming effect of the bursting of such a reservoir as that of the Ohio, some 20,000 square miles in extent, sweeping down in its irresistible flood huge blocks of ice and vast moraines, and grinding the detritus to gravel and sands, with which to fill up gulfs and valleys lower down. Doubtless the erosion of the hills right and left of the upper Ohio valley was caused by these deluges, themselves due to the rapid discharge of the

lake. The terraces thus created are not horizontal like the shores of a lake, but are regularly inclined in the same direction as the fluvial emissary.

Like the lakes, the watercourses also were displaced by the action of the glaciers. Some basins were emptied, others filled up, while the original course of certain rivers was reversed, so that some flow south or north which had formerly a

Fig. 90.—Drumlins of Wisconsin.
Scale 1 : 200,000.



northern or southern trend. During the progress of the glaciers the streams were naturally deflected in the direction of the south. Thus the Red River of the North, at present the main headstream of the Nelson, which discharges into Hudson Bay, flowed at that time southwards to the Mississippi.

So also Lake Michigan sent its overflow south-westwards through the Des

Plaines (Illinois) River, and thus, like the Minnesota, also belonged to the Mississippi slope. Lastly, at the other extremity of the basin the Maumee, now tributary to Lake Erie, as well as the Genesee and Oswego, affluents of Lake Ontario, had been deflected southwards to the Mississippi through the Ohio.

But then came the great débâcle, which gave rise to such vast lacustrine basins as, for instance, the geological Lake Agassiz, of which Winnipeg is but a feeble survival. When these basins were exhausted, and the huge accumulations of the ancient moraines broken up by the flood-waters, and redistributed in fresh mounds or barriers of glacial drift, then the various watercourses had to seek new outlets along the lines of least resistance on the convulsed plains. Thus, since the epoch when the immense ice-cap was melted which formerly covered this larger "Greenland" to a height of several hundred, possibly several thousand, yards, the relief of the land has been profoundly modified by erosive action.

Innumerable lacustrine reservoirs, especially in Minnesota and Wisconsin, have remained in the bed of the cavities throughout the whole region limited southwards by the frontal moraines. Such are the "ten thousand" lakes, among which the Mississippi and the Red River of the North take their rise; such also are the sheets of water dotted over the district south of Lake Superior, as well as those of south Wisconsin, the deep Devil's Lake, and those of Mendota and Monona, forming the peninsula on which stands the state capital, Madison City.

In Iowa the glacial basins of similar formation have received the name of "walled lakes," the lower moraine damming them up being compared to an artificial stone rampart. The drumlins are no less numerous in these Mississippi regions than in New England, and have even much better preserved their original aspect. Some of them contain auriferous alluvia derived, like the heaped-up boulders, from the northern granite reefs. Here and there the metal is abundant enough for profitable mining.

Present Hydrographic Systems.

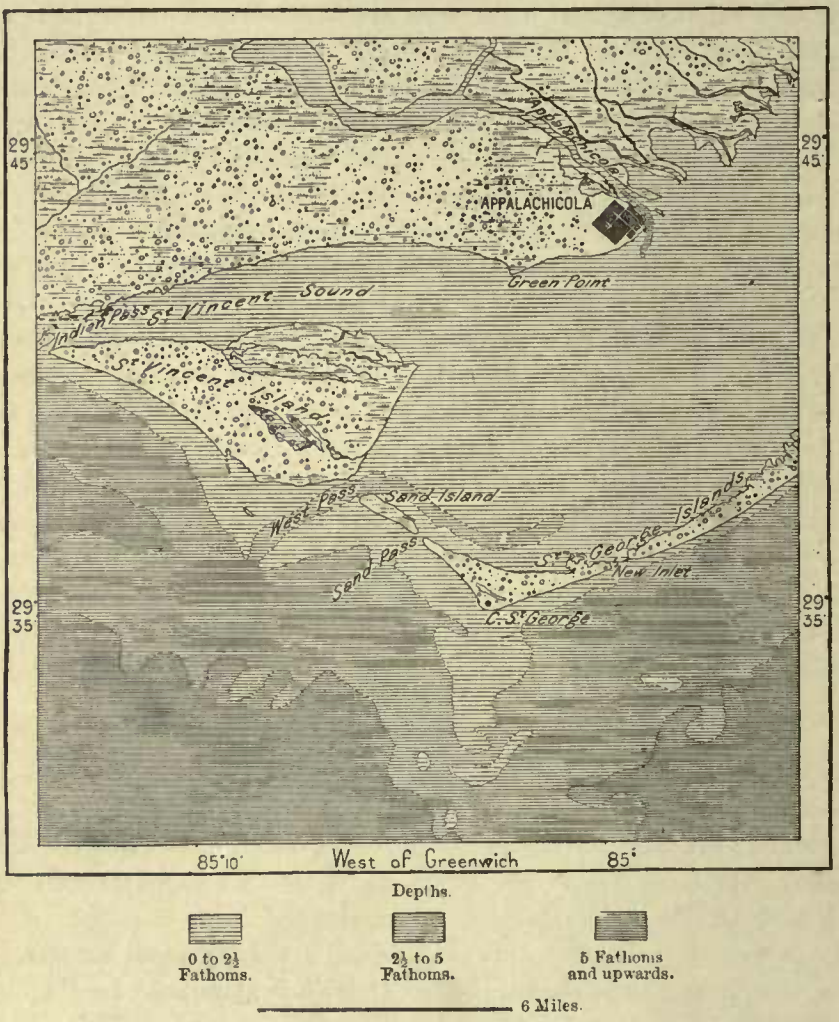
The affluents flowing from the central plain of the Union to the Great Lakes represent but a very small volume of water. Such are the Saint Louis, source of the Saint Lawrence; the Menominee and Fox, which reach Lake Michigan at Green Bay; the Saint Joseph, the Grand River, the Muskegon or "Swampy," flowing through the peninsula to the east side of Lake Michigan, and the Maumee, a western tributary of Lake Erie, all relatively small streams. The Genesee, one of the minor affluents of Lake Ontario, is noteworthy for the analogy it presents to its neighbour, the Niagara, copious emissary of Lake Erie. It flows at first in a placid stream through a somewhat broken upland until it reaches Portageville, in Wyoming County. Here the Genesee descends from the plateau into a deep gorge, which has been gradually excavated by the erosive action of its current. The first three cataracts have a total fall of 260 feet, while the rocky walls of the lower gorge rise to a height of nearly 400 feet. Farther on the stream again meanders through the plains as far as the city of Rochester, where it again develops three successive falls with a total height of 200 feet, plunging

over the escarpment of Niagara limestone, which forms a vast bend south of Ontario, north of Huron, and west of Michigan. The cascades, chasms, and forest growths, descending to the water's edge at the rocky ledges and in the glens, presented vistas of marvellous beauty to the first explorers; but all this lovely scenery is now sadly marred by workshops, scaffoldings, factory chimneys, and bridges.

A few lakes, flooding the narrow valleys disposed in the direction from south

Fig. 91.—Mouths of the Appalachicola

Scale 1 : 300,000.



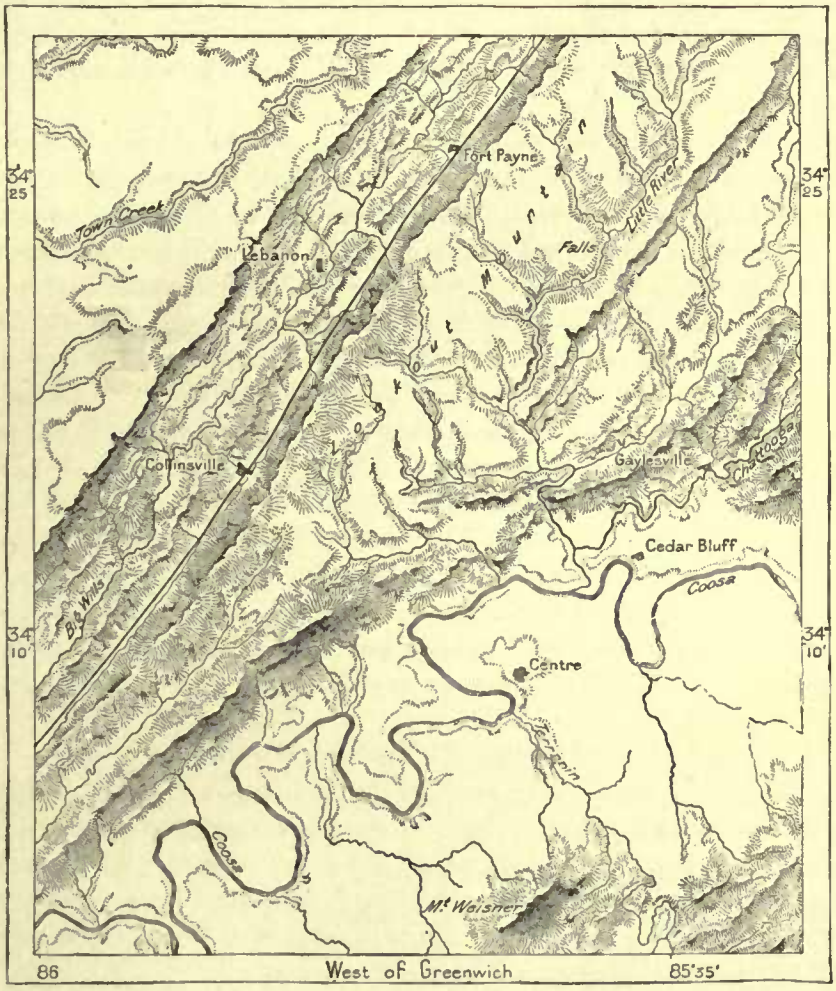
to north, send their surplus waters to the Genesee. These lakes are the remains of ancient fiords which formed part of the original Ontario Sea, and which became separated from the main reservoir by the accumulated mass of moraines comprised politically within the territory of New York, although belonging physically to the great central plain.

Other lakes of much larger size have shared in the geological history of the basins remoulded by glacial action. Such are the lakes of the Iroquois, or "Six

Nations," long winding sheets of water, in which are mirrored the verdant slopes on both sides. Viewed as a whole, these basins present the aspect of a fan with ribs diverging from north to south-west, south, and south-east. Canandaigua, the first basin east of the Genesee River, is followed by Keuka, or "Crooked Lake," Seneca and Cayuga ("Swampy," in Iroquois); Cayuga is the longest of all, stretching from south to north a total distance of nearly 40 miles.

Then follow in their order from west to east Owasco, Skaneateles, Otisco,

Fig. 92.—Eroded Plateaux of the Upper Coosa.
Scale 1 : 450,000.



Onondaga, and Oneida. The last mentioned is at once the widest and one of the shallowest, having a depth of scarcely 60 feet. The others, on the contrary, have preserved their character as fiords, and are consequently much deeper in their central cavities, Skaneateles 320 feet, Cayuga 400, Seneca 500; hence these basins seldom freeze in winter. All discharge northwards to Ontario through the Oswego River, the ancient Shwejem or "Black" River of the Iroquois.

East of the Mississippi the streams flowing in independent channels to the Gulf of Mexico have a considerable extent of drainage area south-west of the Appalachian Mountains. The first river reaching the gulf west of the peninsula of Florida is the Chattahoochee, that is, "River of the Hoochees or Uchees," which rises in the southern Appalachian group, and trends first towards the south-west, along the line of prolongation of the main axis of the Appalachian system.

Beyond its upper course, where it flows in a shingly granite bed strewn with bright crystals, the limpid stream descends through a series of cascades from terrace to terrace, down to the lower plains. After its confluence with the Flint it takes the name of Appalachicola from the ancient inhabitants of the district ("river of the Appalaches" in the Creek language), and, like the rivers of Carolina and Georgia, enters the sea through shallow waters obstructed by a bar.

The Alabama, whose catchment basin occupies nearly the whole space comprised between the Chattahoochee and the Mississippi, also has its rise amongst the terminal Appalachian groups. From its source to its mouth, despite numerous extensive windings to right and left, it maintains the normal course from north-east to south-west. All the swellings of the ground, as well as the border ridges of the plateaux on either side of the fluvial valleys, are likewise regularly disposed in the same direction, exactly in a line with the main Appalachian axis.

Flowing at first under the name of the Coosa, the river takes towards its middle course the designation of the Alabama. It falls into Mobile Bay through a ramifying delta, whose sedimentary deposits are rapidly encroaching on the waters of the bay. To the Alabama system now belongs the Tombigbee, which, after its junction with the Tuscaloosa ("Black Warrior"), communicates with the delta through an intricate network of lateral channels. But at a former epoch the Tombigbee was an independent stream, reaching the gulf in a separate channel. Both watercourses are accessible to steamers, which ascend their turbid currents for a great distance into the interior of the plains.

The Mississippi-Missouri System.

The Mississippi, main artery of the United States, may be taken as the type of a great watercourse. Unlike most rivers with extensive ramifications, it does not take its rise in the glaciers of some lofty mountain range; nor, viewed as a whole, does its current offer any great changes of level. From the lakes at its source to its terminal mouths it presents an almost uniform incline, its course describing an extremely elongated parabolic curve.

Following the main continental axis, the Mississippi traverses the great central plain which divides into two distinct sections the whole of this division of the globe. The Mississippi is thus in a pre-eminent sense the fluvial artery of North America, and the contour lines of its catchment basin coincide with the main features of the continental relief. On the west side the Rocky Mountains with the Utah plateau, on the east the parallel foldings of the Appalachian system, constitute the outer rims of the central depression, which stretches from the Arctic

Ocean to the Gulf of Mexico, and the southern section of which is watered by the Mississippi and its lateral branches.

Whether below the confluence the united waters of the great central depression of North America should not bear the name of Missouri, is a question which has long been discussed, and is even still the subject of academic debates. The geographers who would like to re-baptise the Mississippi keep their eyes shut to every consideration except a fact of secondary importance, that is, the distance from source to mouth expressed in so many leagues or miles.

But geography is not a question of figures; nor are length of course or volume of water the primary facts in the classification of rivers. History tells us that the displacement of tribes or nations, and the general movement of traffic along main trade-routes are the chief factors to be considered in retaining the names of rivers traversing a great extent of country. But these historic and commercial movements are determined especially by the lay of the land, the direction of the fluvial basins, the general slope and the consequent facilities afforded for migrations and international intercourse.

From this standpoint the lower Mississippi, and not the Missouri, obviously forms the continuation of the upper Mississippi. For the United States, viewed as a whole, the natural parting-line for climate, economic plants and populations is that traced by the Mississippi from its source to its delta. On one side stretches the East, on the other the Far West of the North American Union, with all their endless contrasts of soil, temperature and natural resources.

From Lake Itasca to the sea, the great watercourse, a "meridian in motion," follows the median depression of the basin, whereas the Missouri descends obliquely to the main continental axis. Moreover, the valley of the Mississippi preserves throughout the same physical characters, or at least the changes are effected by extremely slow transitions. Whether flowing through savannas or prairies, pine or "cypress" forests, the same horizon, allowing for differences of latitude, is everywhere presented to the traveller sailing down the great artery.

On the other hand a totally distinct and far more diversified physiognomy is imparted to the Missouri by the lofty ranges where its farthest headwaters have their source, by its gloomy cañons and swirling rapids, by the eruptive rocks, scoriæ and lavas skirting its banks. Geologically speaking, the Missouri is a river of entirely different character until it reaches the central depression.

Thus, all things considered, popular usage has done well to retain the name of the central branch for the whole system. This name, however, has been slightly modified from the Algonquin *Misi Sepe*, *Misi Sipi*, an expression also applied by the natives to several rivers in the Dominion of Canada. This designation appeared too simple to Chateaubriand, who changed it to *Meschacébé*, with the imaginary meaning of "Father of Waters," often recurring in poetic diction.

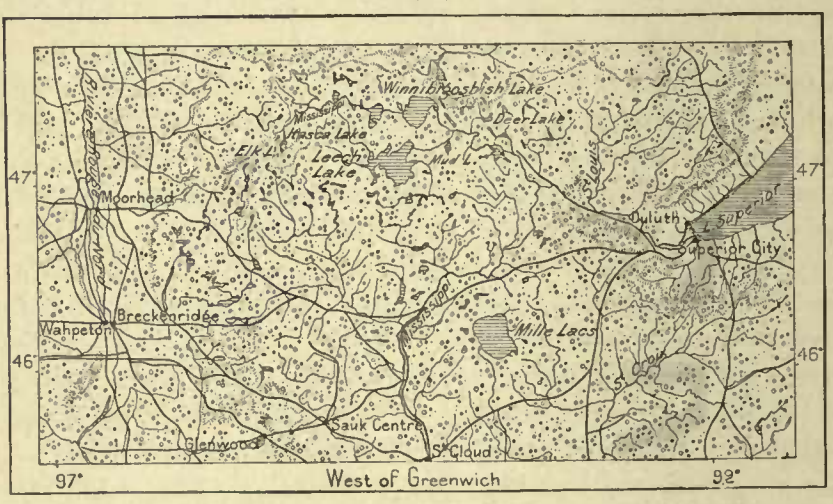
After the glacial and lacustrine epochs the upper Mississippi must have frequently changed its main headwaters according to the vicissitudes of the climate, the desiccation of meres and lakes, landslips, growth of morasses and forests, the operations of the beaver, and the thousand phenomena which tend to

modify the slope of the land in a region of uncertain drainage and partly under water. Since 1832 the farthest headstream is known to have its r se on the northern slope of one of the southern spurs of the scarcely perceptible divide bearing the Canadian name of *Hauteur des Terres*, usually translated the "Height of Land." Various lakelets which have given rise to angry discussions connected with claims of priority of discovery, are the farthest reservoirs where are collected the young waters of the Mississippi properly so called. Winding sedge-grown channels flow from these meres to a ramifying lake known to the Ojibways by the name of Omochkos, a term which the Canadian trappers translated by the French "La Biche," whence the English designation, "Elk Lake;" Schoolcraft, its first scientific explorer, calls it Itasca, a word which, like many other geographical names of like ending, appears to be of Algonquin derivation.

On the crest of the highest sources the elevation of the land is estimated at

Fig. 93.—Sources of the Mississippi.

Scale 1 : 4,500,000.



1,670 feet, although Itasca itself is only 1,575 feet above sea-level. The little emissary, which flows first in the direction of the north as if to join the Red River of the Hudson Bay basin, forms the first distinct current of the Mississippi, which over 3,000 miles farther south falls into the Gulf of Mexico, being an average incline of about seven or eight inches to the mile.

At its origin, the Mississippi, unnavigable even for canoes, and scarcely more than 12 or 13 feet wide, trickles through marshy meadow-lands overgrown with wild rice, reeds, and flags, and skirted by moderately elevated pine-clad dunes. Other lakes follow in the fluvial valley, which bends round to the east, and then to the south, according to the normal direction of the North-American divide.

On both banks converge several other watercourses, which are also affluents from the lakes and meres dotted over the granite plateau. This is the region of the portages, where the Indians and half-breeds passed with their boats from the Mississippi slope to that of the Red River of the North, or else to that of the great

Canadian lakes, but which is now traversed by railways. Till recently the successive terraces of the plateau were indicated by a number of little cataracts a few yards high, such as the Pokegama and Little Falls. But the general aspect of the river was little affected by these obstructions, which scarcely ruffled the tranquil surface of the stream. At present all these inequalities of level have been effaced by means of dams, which retain the waters in extensive reservoirs, where they are husbanded for the dry season. The two chief basins are those of Lakes Winnibigoshish and Leech, and all four reservoirs, completed in 1890, have a collective area of about 3,000 square miles, with a capacity of some 70 billion cubic feet.

Fig. 94.—Lake Itasca.
Scale 1 : 130,000.

The limit of the upper course is distinctly indicated by the St. Anthony Falls, which are not so much falls as a series of rapids, with a total incline of 65 feet, and a breadth of about 1,000 feet. The ledge over which the stream tumbles consists of slate slabs resting on a friable sandstone. Hence this rocky barrier can offer but slight resistance to the action of the current, and till recently the falls were in fact retreating very rapidly upstream. Huge blocks detached from the upper strata, and strewn in disorder amid the seething waters, attested the rapidity with which the work of erosion was being accomplished. The industrial city of Minneapolis, and its eastern suburb, Saint Anthony, which utilise the motive power supplied by the falls on both sides of the stream, would consequently have also had to retreat northwards with the cataracts, had not the work of erosion been arrested in the year 1856 by means of dykes and sluices. Hennepin, the first white who visited the falls 176 years previously, has left a sufficiently clear description to determine their position at that date, when the crest

of the cataract stood 1,025 feet lower down than at present. If the retreat has always proceeded at the same rate, 7,800 years must have passed since the Mississippi joined the Minnesota by plunging over a rocky ledge at the foot of the cliff on which now stands Fort Snelling.

At the Saint Anthony Falls, head of the navigation, begins the industrial and commercial life of the Mississippi. Below this point the main stream is joined by numerous affluents, such as the Minnesota, "Whitish Water" or "Cloudy," or Saint Peter, the Wapsipinicon, Cedar, Turkey, Iowa, Skunk, and Desmoines on the right bank; the Saint Croix, Chippewa, Wisconsin, or "Brown," the Rock, and the Illinois, the "rivière des Illinois" of the early French explorers, on the left.

By the contributions of all these streams the Mississippi is swollen to such a size that far above the Missouri confluence it flows in as broad a channel as it does from Saint Louis to the Gulf of Mexico. Amongst the affluents of the main stream, three especially recall the ancient lacustrine period, which was characterised by a discharge of running waters in opposite directions. These rivers are the Minnesota, the Saint Croix, and the Illinois. The Minnesota rises at an altitude of nearly 1,000 feet on the divide between Big Stone Lake to the south, and Traverse Lake draining northwards through Red River of the North. The general aspect of the Minnesota valley, far too broad for the stream winding through its lowest depression, seems to show that at a former epoch it formed the bed of a far larger river descending from the north, perhaps from the Canadian Lake Winnipeg basin. The present parting line is formed exclusively of glacial drift redistributed by the running waters. In point of fact, the Minnesota, or "Cloudy Water," was formerly the main stream, of which the present Mississippi was only an affluent. The Minnesota is the original waterway of the country, while the Mississippi, still unfinished and obstructed by rocky ledges, dates from post-glacial times.

The Saint Croix, also a modest stream in a vast river bed, was the emissary of Lake Superior at the time when this basin, pressed southwards by the ice-cap, but still closed in the direction of the east, sent its overflow to the Gulf of Mexico.

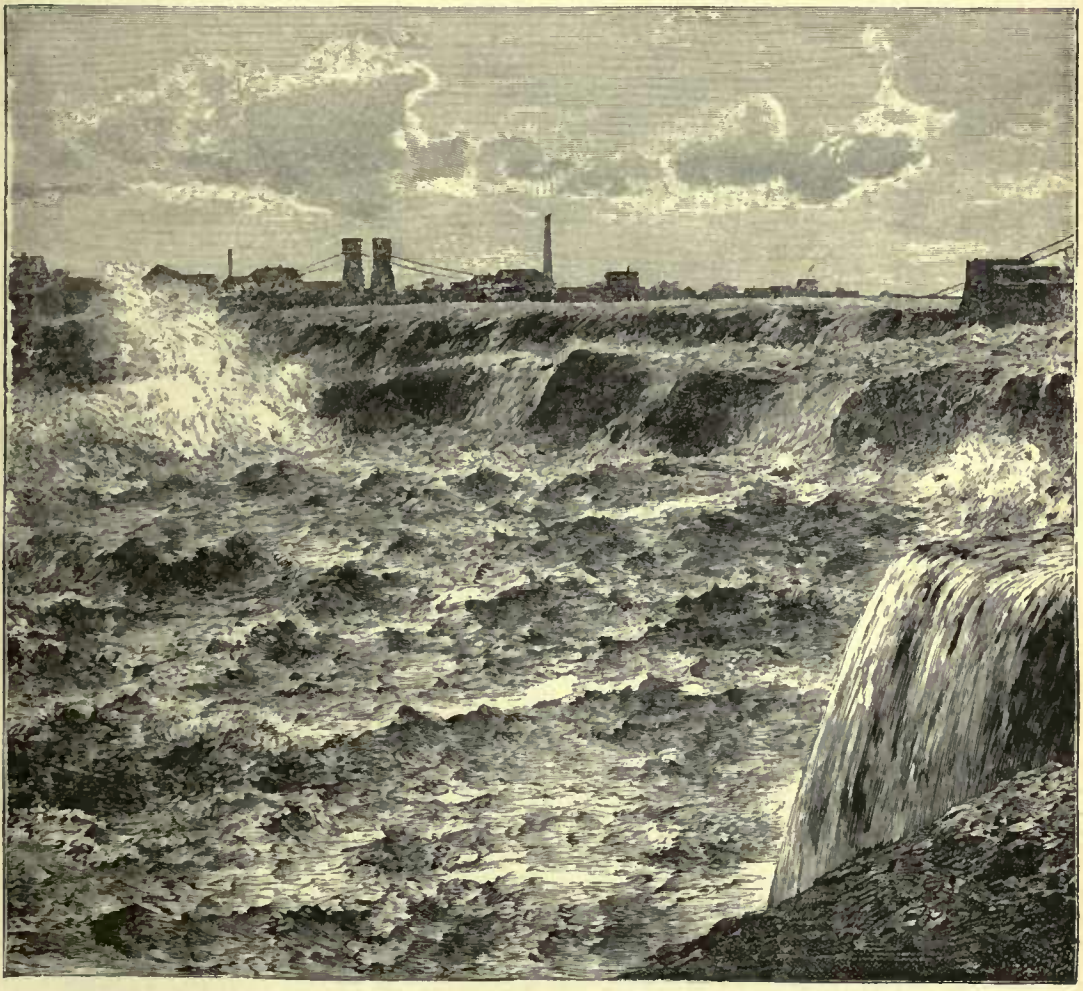
The Des Plaines River also, that is, the main branch of the Illinois (the river of the Illini, or "Men" in a pre-eminent sense), belongs, one may say, as much to the basin of the Great Lakes as to that of the Mississippi; its upper valley for a space of nearly 100 miles is an old fluvial channel communicating with Lake Michigan. A small ridge, formerly pierced by water gaps, now separates this narrow gulley from the present depression of the great lake, and from the whole of the Saint Lawrence hydrographic system. On reaching the transverse depression, of which the extremity is occupied by the city of Chicago, the Des Plaines River hesitates between the two almost horizontal slopes before deciding to join the Mississippi basin. Till recently it expanded into vast marshes with uncertain incline, and the Calumet, one of its branches, even flowed eastwards to Lake Michigan.

At present a navigable canal excavated in this depression at less than ten feet below the lacustrine level, and little more than 580 feet above the Gulf of Mexico, connects the port of Chicago with the lower course of the Illinois, which is accessible throughout the year to vessels of average draught. Even before the

construction of these hydraulic works light craft were able after protracted rains to pass from Lake Michigan to the Mississippi by the Chicago river.

About 23 miles below the Illinois confluence, and some 1,850 miles from its sources on the lacustrine plateau, the Mississippi is joined by its great western branch, the Missouri, or Missisouri, which was also called Petikanui, or the "Muddy River," by the natives visited by the first French explorers. The Missouri itself rises about 3,000 miles above the confluence, in the heart of the Rocky

Fig. 95.—Saint Anthony Falls, on the Upper Mississippi.



Mountains and west of several of the ranges; hence to reach the Mississippi it has to force its way in deep cañons through the intervening mountain barriers.

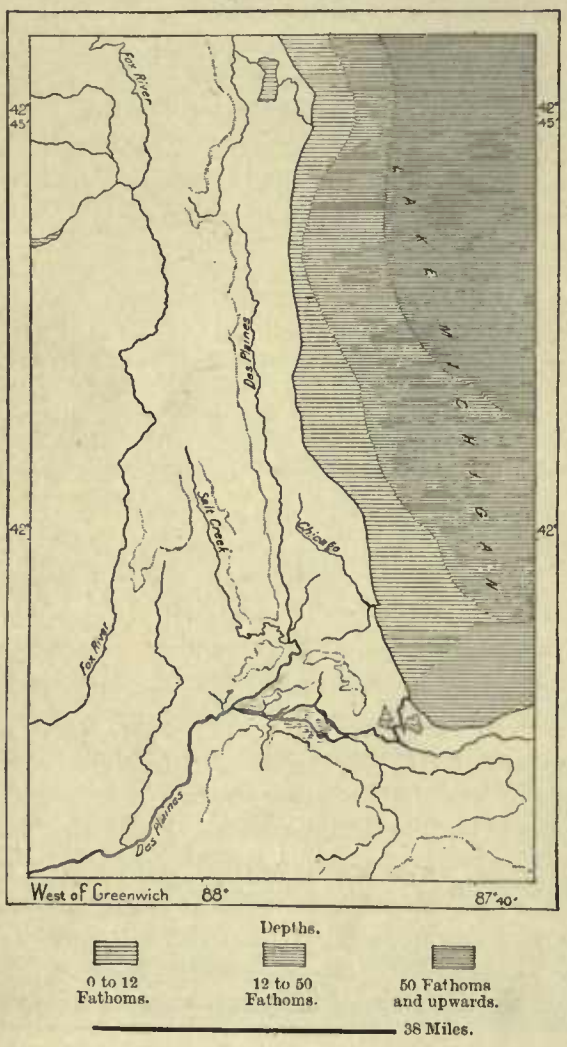
The fluvial valleys nowhere present the appearance of having been originally formed to allow the stream to escape eastwards, or through the natural depressions or primitive foldings of the crust of the earth. They seem rather to be gaps or openings disposed in a direction absolutely independent of the main orographic axis, excavated, in fact, transversely to the original granitic nucleus and to the

successive strata of sedimentary rocks, which were afterwards deposited and still later covered here and there by discharges of erupted matter.

The farthest headstream rises in a little lake on the upland plateau, not far from one of the sources of the Snake River, which belongs to the Columbian fluvial system. But this headstream takes the name, not of the Missouri or "Mad River," but of the Red Rock River, which joins the Big Hole and other torrents to form the Jefferson, chief branch of the main stream. But, following the precedent set by Lewis and Clarke, who discovered this region of the Missouri headwaters at the beginning of the century, the inhabitants of Montana do not apply the general designation of Missouri to the Jefferson fork until it reaches the alluvial plains and is swollen by the contributions of two other rivers, the Madison and Gallatin, both converging on its right bank.

Fig. 96.—Sill of the Illinois River before the Foundation of Chicago.

Scale 1 : 1,500,000.



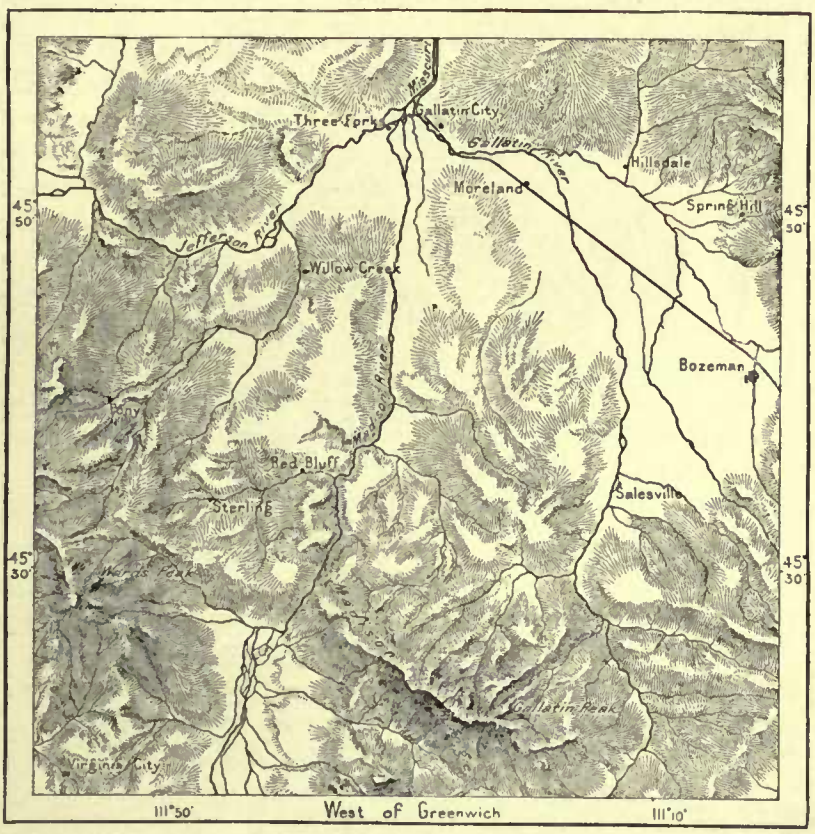
East of the confluence limestone cliffs, piled like towers one above the other, dominate the united stream, outlet of an old lake where the current glides along between clusters of wooded islets. Of the three forks, the Gallatin, or eastern branch, is the only one that has its rise east of the main range. The other two—Madison in the middle, and Jefferson in the west—draw their farthest supplies from western slopes. But the three fluvial valleys consist all alike of a series of long-vanished lacustrine basins connected by gorges which have been excavated by the running waters. The liquid masses, far more copious formerly than at present, have scooped out the upper cirques, leaving in the old depressions a few terraced beaches, which indicate the successive retreat of the glacial waters. The sediment deposited at the bottom of the lacustrine basins represents the remains of the eroded rocks, and in many places are formed of auriferous strata The

Alder Gulch alone, which drains to the upper Jefferson, has yielded over $30,000,000 of pure gold.

The region of the Missouri headwaters, however, owes it celebrity not to this Eldorado, but to the natural phenomena, such as thermal waters, fumeroles, silicious and calcareous sedimentary deposits, geysers or intermittent jets of vapours or boiling waters, which have earned for it the name of "Wonderland," and which have caused it to be reserved as a "National Park," the common inheritance of the whole nation. Vague rumours had long been current regarding the

Fig. 97.—The Three Forks of the Missouri.

Scale 1 : 780,000.



marvellous springs and fountains of this district. On the maps of their itineraries published by Lewis and Clarke at the beginning of the century, the words "sulphur, hot springs," indicate the position of the region which has now become so famous. Its wonders were seen by a trapper named Coulter about the year 1810, but his statements found little credit, and were soon forgotten.

At last a first special exploration was undertaken by Cook and Folsom in 1869, and two years afterwards a body of naturalists, under the geologist F. V. Hayden, prepared a full description of the springs and other natural curiosities, and at the same time made the first accurate survey of the whole region. Their return with

their albums of photographs, plans, and drawings was hailed by the American public with a universal cry of admiration, to which practical effect was given by a vote of Congress, reserving the territory as the common property of the nation. This territory occupies several upland valleys, at a mean altitude of 7,500 feet, on the waterparting between the Missouri and Columbia basins.

Below the junction of the Three Forks the Missouri first trends northwards, following the direction of the converging affluents, but still on this side of the main range of the Rockies, here called the Snow Mountains. The "Gate of the Rocky Mountains," as Lewis and Clarke have called the gorge through which the united waters escape to the plains, is flanked by granite walls, rising nearly 1,350

Fig. 98.—Gate of the Rockies and Missouri Falls.
Scale 1 : 750,000.

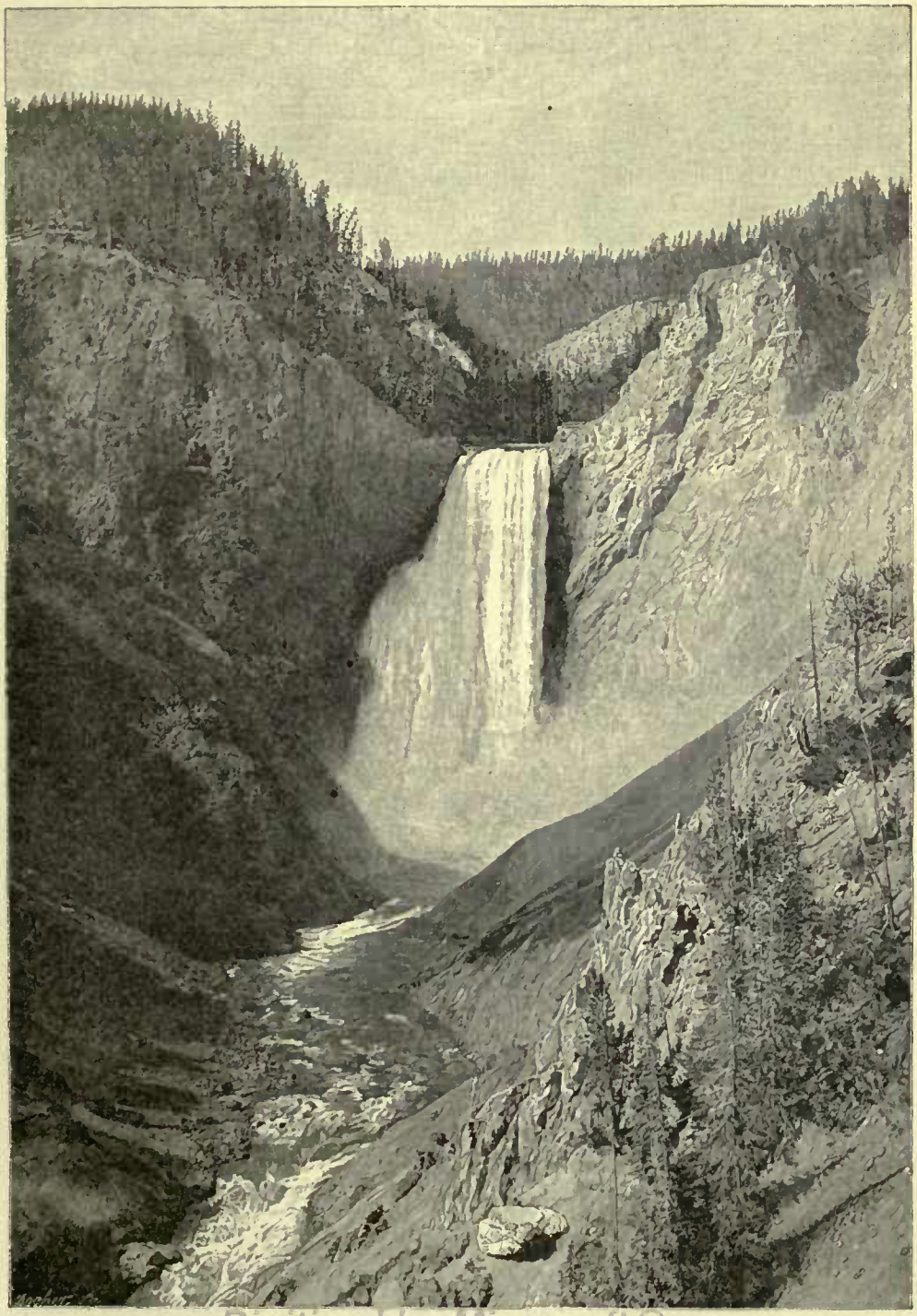
feet sheer above the stream. The bed of the Missouri, pent up between these gloomy ramparts, is scarcely 500 feet wide, and ledges large enough to afford standing room between the cliffs and the current occur only at long intervals.

But even at the outlet of this cañon the mountain barriers have not yet been pierced through and through. The foot hills of the main range have still to be traversed by other romantic ravines, by which the Missouri descends to the plains in a succession of foaming cataracts. The series of falls and rapids has a collective incline of 160 feet in a distance of about 11 miles. At the Great Falls, last and finest of the series, the stream is precipitated in a single sheet a height of 80 feet.

During the floods boats ascend to the very foot of these falls, and above the

portage the main stream is also accessible to small craft as far as the Three Forks confluence. But at ordinary times the head of the navigation lies 60 miles lower

Fig. 99.—Lower Falls of the Yellowstone.



down, at Fort Benton, near the junction of the Teton and Marias, or Bear River; here the Missouri describes a last bend towards the north-east, through the "Bad

Lands" and plateaux abutting on the Rockies, and then begins to trend in the direction of the Mississippi. In this part of its course, above the Yellowstone confluence, it is joined by several streams, such as the Milk, White Mud, Poplar and Big Muddy, all of which take their rise in Canadian territory.

The copious stream to which the Canadian trappers gave the name of "Pierre Jaune," whence the Anglo-American form, Yellowstone, constitutes, after the Jefferson and the "Three Forks," the main headstream of the upper Missouri ramifying system. It is also better known than the others, thanks to the wonders of the "National Park," partly comprised within its basin. The Yellowstone is further distinguished from the Jefferson, inasmuch as it has its source on a plateau of the Rocky Mountains, which forms a well-marked centre of dispersion for running waters flowing in opposite directions.

Explorers even speak of fenny tracts, whence the sluggish waters diverge east and west towards the two opposite marine basins. The so-called *Two-Ocean Pass* is one of these eroded valleys, with a scarcely perceptible double incline. The nearly horizontal summit of the pass, 8,000 feet high, is occupied by spongy herbage under water during the rainy season, and sending east and west small rivulets which flow from a common source, but which lower down ramify in such a way as to develop a network of running waters round about the swampy summit. In the north rises Atlantic Creek, which is tributary to the Gulf of Mexico, through the Yellowstone, Missouri, and Mississippi; in the south flows Pacific Creek, which drains to the Pacific Ocean, through the Snake and Columbia Rivers.

Still farther south, that is, in the Wind River Range, the river of like name takes its rise, and forms with the Big Horn one of the chief headwaters of the Yellowstone. Close by are also the farthest sources of the Colorado, here called the Green River, which descends southwards to the Gulf of California, while other streamlets trend westwards to the Columbia. Union Peak, as the intermediate crest has been named by Reynolds, must be regarded as the chief central point of the United States for the dispersion of its running waters to the surrounding marine basins; here is the true continental divide.

The main branch of the upper Yellowstone flows north-westwards in the direction of the Yellowstone Lake (7,738 feet), a lacustrine basin which is encircled by mountains on all sides, and which, from its form, seems rather to be a group of lakes ramifying like the ribs of a fan towards the south and south-west. The Eustis, placed by Lewis and Clarke in this region, lies very nearly on the spot really occupied by the Yellowstone. Several verdure-clad islands, some flat, some hilly, present a charming contrast to the blue waters of the lake, whose sandy margin is composed almost entirely of granular or sharp fragments of obsidian, and of the little crystals known as "Californian diamonds." The lake, which is 300 feet deep, contains no fish except trout.

At the outlet towards the northern extremity the overflow escapes through a narrow gorge between the plateaux of lava where the hot springs emit smoky vapours. Farther on this Yellowstone emissary rolls along an inclined plane, tumbling over a succession of superb cataracts on the bed of the Grand Cañon,

which cuts deeper and deeper into the volcanic plateau, until it reaches a depth of from 1,200 to 1,500 feet. The river, which flows in the sharp notch at the bottom, is here joined by several affluents which are precipitated over lateral cascades into the gloomy chasm. At the Upper Fall the main stream shoots over a rocky ledge 112 feet in height, and about half a mile farther on it suddenly

Fig. 100.—Two Ocean Pass.
Scale 1 : 75,000.

rolls over a steep precipice 300 feet in height into the depths of the abyss, down whose sinuous course it roars and tears along, an emerald-green band, flecked with snowy foam, between the highly coloured walls of the cañon.

Below the Yellowstone confluence the Missouri, still 1,250 miles from the Mississippi, has already acquired the aspect which it retains throughout the whole of its middle course. Its proportions remain everywhere much the same, except

that its depth increases with the incline until it reaches some 65 feet at the confluence. The broader bed, which is flooded only during the inundations, and which is indicated by parallel banks over half a mile apart, winds through the boundless prairie, enclosing a second and much narrower channel, the normal bed of the stream. In this bed the Missouri meanders from side to side of the wider valley, in one place describing regular curves, in another developing eccentric sinuosities, accompanied by stagnant pools, backwaters, false rivers, and channels; islands and sandbanks follow in long succession; the banks, shaded here and there with clumps or a fringe of tall trees, are flooded by a perennial stream for years together, while elsewhere the scrub or annual growth of herbage is swept down by the spring freshets. The relief of the alluvial river banks is subject to yearly change by the sands and clays washed down with the torrents flowing from the plateaux abutting on the Rocky Mountains, and the water, which issues pure and limpid from the upland gorges, becomes turbid and yellow with the muddy sediment carried away from the upper reaches and deposited lower down.

The direction of the Missouri affluents is determined by the general tilt of the land. Between the Rocky Mountains and the great central depression of the continent there is a double incline: on the one hand the ground slopes from west to east, in the direction of the Mississippi; on the other it falls from north to south, that is, from the crest of the general waterparting towards the Gulf of Mexico.

The Missouri itself at first follows the former direction, but is then arrested by the long escarpment of the Coteau du Missouri, and thus deflected south and south-east parallel with the course of the Mississippi, but at last resumes the normal direction from west to east. The few affluents, such as the Dakota or James River, and the Big Sioux, which join its left bank, descend like the Mississippi, from the north. The more numerous watercourses joining its right bank, within the vast semicircle described from Fort Benton to Kansas City, all flow from west to east, except the Little Missouri, which runs parallel with the Yellowstone.

Amongst the latter is the Cannon Ball, which has received this eccentric designation from the globular sandstone concretions which are rolled down by its current and strewn along its banks. The "balls" are of all sizes, from that of a pistol bullet to enormous boulders several yards in circumference, and often as round as if wrought by the hand of man. The White River, another of these Missouri affluents, is so named from the milky colour that it takes whilst traversing the "Bad Lands." Above its confluence, and especially at Mandan, destructive floods are often caused when the ice breaks up at the end of winter, and the drifting masses are arrested and piled up at the sharp windings of the river.

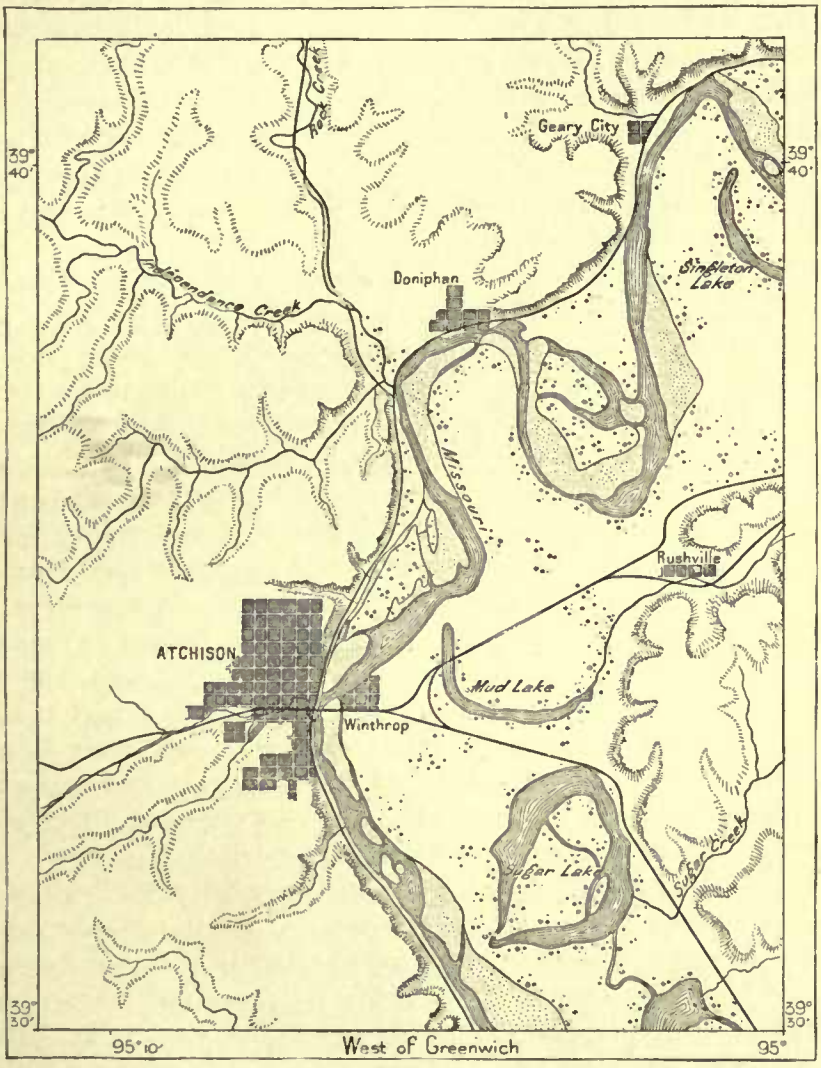
With the single exception of the Platte or Nebraska, whose northern headwaters rise on the inner plateaux of the Rocky Mountains in the desert wastes and "parks" limited eastwards by the Colorado peaks, all these Missouri affluents, Big Cheyenne, White River, Niobrara, Kaw or Kansas, that is, the "Smoky," have their origin at the east foot of the main range. In their general aspect they also resemble each other, flowing at a uniform incline in long shallow beds.

The Nebraska, or "Platte" as the Algonquin term has been translated by the

Canadian trappers, is a type of these "flat" rivers, whose slender volume expands over a very wide channel, forming a broad zone of verdure, grassy along the margins, arborescent in the cavities, enclosed between two bordering plains with a more stunted and sparse vegetation. In many places the Platte has a width of

Fig. 101.—Meanderings and False Rivers of the Missouri at Atchison.

Scale 1 : 160,000.



nine or ten miles from bank to bank, and its channel, over 500 miles long, forms the great highway running from the lower Missouri in the direction of the Rocky Mountains. This route was formerly followed by the emigrants with their long convoys of mules and teams of oxen. At present one of the transcontinental trunk lines of railway skirts the margin of this river.

Sparsely fed by these watercourses, some of which in summer are mere chains

of swamps or lagoons, the Missouri itself is not as copious a stream at the Mississippi confluence as might be expected from the great length of its course compared with that of the other affluents. Its catchment basin represents half of the Mississippi area of drainage, whereas its discharge does not much exceed one-fifth, say, about 120,000 cubic feet per second, though even this is double such a river as the Rhone, or sixfold that of the Seine. Despite this considerable volume, the Missouri is scarcely available for navigation except in its lower reaches. Owing to the ice in winter, and occasionally to the long summer droughts, steamers are at times unable to ascend beyond its junction with the Niobrara.

The Missouri-Mississippi confluence presents a magnificent prospect during the season of floods, when the swift currents, both nearly a mile broad, clash together and mingle their waters in vast whirlpools. The undulating parting line between the yellow Missouri and blue Mississippi shifts its curves and spirals according to the force and direction of the eddies.

For a long distance both streams flow side by side without losing their identity, and far below their confluence the relatively pure water of the Mississippi is seen skirting the left bank. At last they merge in a single current, which is so heavily charged with sedimentary matter that it rolls seawards almost like liquid mud. During the present century the confluence of the two rivers has been displaced about eight miles southwards.

Below their junction the united waters are still entangled in the intricacies of the hilly region. After passing beneath the great steel arch railway bridge at Saint Louis, the mighty stream, still 1,200 miles from its mouth, is pent up in a narrow bed by limestone cliffs, some of which rise 200 feet above low-water mark.

The cliffs on the right bank, which the Mississippi is continually eroding, are the extreme escarpments of the Ozark Hills, this range, it is supposed by some geologists, formerly continued eastwards and connected with the ridges traversing the states of Illinois and Indiana, but it has been gradually pierced by the river forcing its way seawards. At Great Tower, a bluff rising like a watch-tower in midstream, the circular line of erosion traced by the waters may be seen at a height of 130 feet above the present level of the Mississippi.

Since the time of Schoolcraft some geologists have accepted the hypothesis that the current, formerly dammed up by this rampart of the Ozark Hills, expanded higher up in a vast lake covering, as far north as the city of Prairie du Chien in Wisconsin, the plains of the Missouri, Iowa, Illinois, and lower Wisconsin Rivers. This basin probably communicated with the great lakes, Michigan, Huron, and Erie, which on their part were limited eastwards by the still unpierced rocky barrier of the Niagara. There was a time when the waters of the great inland sea, instead of escaping through the channel of the Saint Lawrence, were drawn off by another Niagara, the "Mississippi Falls," caused by the barrier of the Ozark Hills. These falls would appear to have gradually receded up stream, just as those of Niagara are gradually retreating towards Lake Erie. At the same time the level of the lacustrine basin must have gradually fallen, until it became separated from Lake Michigan, after which the effacement of the Ozark barrier equalised the slope and transformed the Mississippi Lake to a river.

On the right bank stands Cape Girardeau, last bluff of the Ozark range, immediately below which the bayous * of the Mississippi escape towards the low-lying lands of the Saint Francis. On the left side, Commerce, an obscure village with an ambitious name, indicates the point where the Mississippi washes the foot of the southernmost Illinois hill, and flows for the last time over a rocky bed. Lower down, the plain, for a moment interrupted by the rocks of Herculanum and Grand Tower, expands to far larger proportions than above Saint Louis, developing for a distance of over 1,000 miles a dreary succession of sombre woodlands.

The beginning of this immense alluvial plain is fittingly indicated by the Ohio confluence. Here the traveller might fancy himself transported to an island-studded sea. In whatever direction his gaze is turned he beholds vast expanses of water spreading away beyond the horizon—in the north-west the Mississippi, in the east the mighty Ohio, in the south the vast channel of the main stream, where are intermingled the waters of the converging affluents.

Of all the streams belonging to the Mississippi basin, the Ohio most resembles the rivers of West Europe. Hence the French pioneers, delighted at the sight of sylvan scenery which recalled that of their native land, gave the name of "Belle Rivière" to this watercourse, which was long confounded with the Wabouskigon or Wabash. The hills skirting its banks are gently inclined and overgrown with trees of the same genera as those of Europe. The riverine tracts are now studded with pleasant towns and villages, while cultivated fields, gardens, and orchards complete the picture of a charming landscape.

The Ohio valley is divided into three sharply-defined sections. In the upper region of its basin the two forks, Alleghany and Monongahela (the "Mal Engueulée" of the early French explorers), are regarded as having equal claims to the title of main stream. The Alleghany, which is the longer of the two, and which is here and there narrowed by artificial banks of scoriæ thrown up by the local factories, rises in the plateau west of the mountains bearing its name, and receives from the north the emissary of the little Chautauqua Lake near Lake Erie, but 726 feet above its level. The Conewango, or upper course of the Alleghany, descends from this basin through a series of narrow valleys southwards to its confluence with the Monongahela, second branch of the upper Ohio.

The Monongahela draws its farthest supplies from the rains and melting snows of the upland Alleghany valleys. After its junction with the Youghiogheny, it winds through a valley composed entirely of carboniferous rocks. Till recently the exposed beds of coal were developed in long black lines on the very banks of the river, and could be worked within a few yards of the landing-stages.

A study of the glacial drifts in the upper Ohio basin has shown that the parting line between the Saint Lawrence and Mississippi basins was probably modified by the action of the ice-cap. At present the crest of the divide between the running waters skirts the south side of Lake Erie within a distance of not

* The term *bayou*, which has come into such general use throughout the lower course of the Mississippi, properly indicates any stream flowing from a lake, or branching off from another stream, or connecting the mouths of a delta. It appears to be a corruption of the French word *boyau*, a gut, channel, or passage.—Ed.

more than from 10 to 20 miles of the shore, whereas before the glacial epoch it stood two or three times as far from the lake. At that time Chautauqua Lake itself was tributary to the Saint Lawrence.

Below Pittsburg begins the middle course of the Ohio, which here winds through plains overlying Devonian and Silurian formations. Flourishing cities have sprung up along its banks, founded for the most part at the issue of lateral fluvial valleys. The northern affluents, such as the Muskingum, the Scioto, and the two Miamis, descend, like the Alleghany, from the lake-studded terrace which skirts the south shore of Lake Erie, and which extends westwards as far as the region south of Lake Michigan.

On the other hand, the southern affluents rise, like the Monongahela, in the longitudinal upland glens of the Appalachians, or at least in the plateau. The Great Kanawha, most copious of these rivers, traverses salt-yielding regions, as does also the Licking, which joins the Ohio at the great city of Cincinnati. The very word Licking, like the Indian term *Mahoning*, of which it is a translation, recalls the lickings or salt licks formerly visited by the mastodon and bison.

Amongst these southern affluents of the Ohio is the Kentucky River, which gives its name to one of the federal states. It joins the main stream above the Louisville Falls, which mark the natural division between its middle and lower course. Here a coral reef, sharp and ramifying as if built up but yesterday, obstructs the stream by a series of dangerous rapids with a total incline of rather more than 20 feet in a space of about three miles. During the floods these rapids disappear altogether, but at low water all navigation is arrested in the river itself, and the falls have to be turned by one or other of the lateral riverine canals.

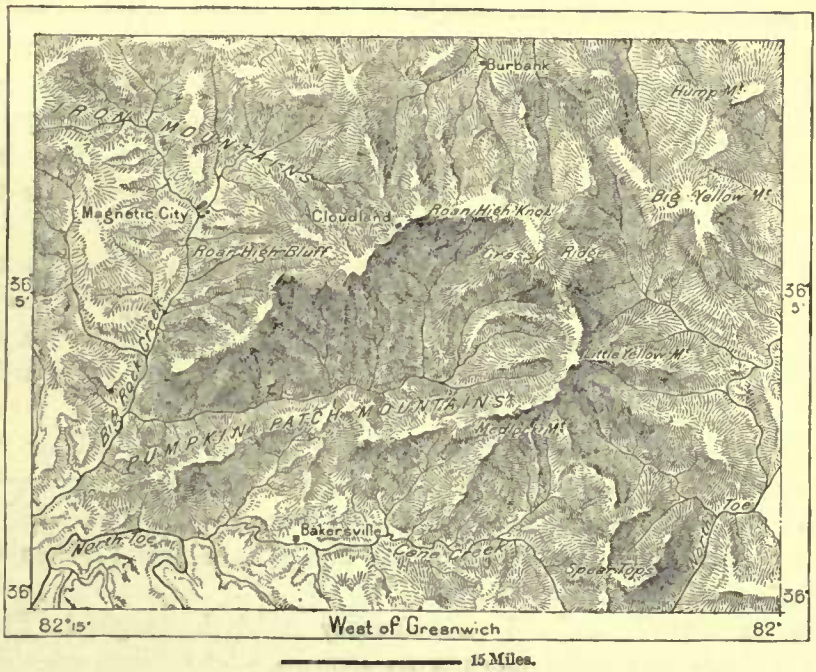
Along its lower course the Ohio valley broadens out, and becomes completely alluvial. The skirting hills retire to a great distance from its banks, while the mouths of the converging streams become masked behind wooded islands and peninsulas. In the north the chief tributary is the Wabash, a placid stream often navigated by the bark canoes of the early Canadian voyageurs.

From the south comes the Green River, which is swollen both by surface waters and underground currents derived from innumerable subterranean reservoirs, and from the famous Mammoth Cave. Green River has its source in "the Knobs" of central Kentucky; but the other two streams, which lower down join the same left bank of the Ohio, draw their farthest supplies from the region of the Appalachians. The Cumberland takes its rise in the mountains of the same name, while the Tennessee, which gives its name to one of the United States, rises much farther back, in the very heart of the hills in Virginia and North Carolina. Its chief head-streams, the Clinch, Holston, and French Broad, are fed by the snows of the Roan Mountains and other lofty crests. After its junction with these affluents the Tennessee continues to flow for some distance in the same south-westerly direction; then instead of entering the valley occupied by one of the Alabama affluents, it trends sharply round to the west and north, thus describing a vast semicircular curve which encloses the much smaller bend of the Cumberland.

The basins of the Tennessee, Kentucky, and especially the Green River have become famous for the carboniferous limestone formations in which the running waters have excavated a labyrinth of the most extensive and most ramifying underground galleries yet discovered. Some only of these caverns have been explored, but the partial researches already made have sufficed to show that the subterranean passages excavated in Kentucky, Tennessee, and Indiana have a total length of many hundred miles.

The excavation of these galleries was certainly accelerated by the presence of the forests which formerly covered the whole country. The rainwater filtering through the accumulated layers of decayed foliage became saturated

Fig. 102.—Roan Mountains
Scale 1 : 225,000.



with carbonic acid gas (carbon dioxide), which exercises a most potent action in dissolving limestone and ferruginous rocks.

Of all these grottoes the largest and the best known is the so-called Mammoth Cave of Kentucky, which lies on the Green River affluent of the Ohio. A portion of the water of this river, escaping through fissures in the rock, disappears in the underground galleries. The main avenue of the Mammoth Cave has a length of about nine miles; but the labyrinth of passages known since the year 1856 comprises more than two hundred alleys with a total length of 150 miles, while the eroded space represents a cube of some 390 billions of cubic feet. Here are concentrated all the marvels of the subterranean world—halls with lofty domes, pointed or semicircular aisles, pendant ceilings as in the Alhambra, stalagmite colonnades, gigantic statues, delicately-embroidered fretwork, narrow channels, and dangerous flights of steps, thundering waterfalls, lakes and torrents.

At present the Mammoth Cave is inhabited by the siredon or axolotl, analogous to those of the Mexican lakes, and various species of blind fishes. Amongst the chologasters blindness is not always complete, and some are occasionally found in the southern basins which can see imperfectly, but in the caverns the eye, having become useless, is entirely atrophied. The amblyopsis, of a pale colour, about four inches long, and probably of marine origin, has the visual apparatus so little developed that it can be detected only by removing a thick membrane by which it is now covered. But sight has been replaced by another sense, and the papillary nerves centred in the head are so sensitive that they warn the animal of the least movement occurring in its watery environment.

A similar compensation has been observed in all the organisms of the invertebrate fauna discovered in the Mammoth Cave. Thus the sense of touch has been abnormally developed in the crustaceans, insects, arachnidæ, worms, and myriapods that have lost the faculty of vision. Certain species, especially those living in the parts of the grottoes farthest removed from the rays of light, still preserve rudimentary eyes or optic nerves, the gradual obliteration and final disappearance of the visual organ taking place differently in the different species. In their gloomy abodes these organisms also gradually lose their coloured pigments, eyes and bright hues being alike useless in such dark surroundings.

In its general behaviour the Ohio is characterised by great irregularity. In the same month of two successive years the volume of its discharge has varied as much as eightfold. The floods also are often of a formidable nature, and the current, 2,000 feet broad and 66 deep, has at times been seen to sweep under the suspension bridge at Cincinnati with a velocity of six miles an hour. In the same year the level of the stream has been known to vary as much as from 50 to 65 feet, and in 1887 the difference between high and low water marks exceeded 70 feet, so great is the reaction of the extremes of temperature and humidity on the hydrology of the Ohio basin. During long droughts the current is often reduced to a depth of not more than two feet.

The disastrous effects of such variations may readily be imagined. From day to day the navigation of the Ohio and its affluents, a total waterway estimated at about 2,300 miles, is liable to be interrupted. Hence the vagaries of the stream, always dreaded by the riverine populations, caused the greatest anxiety in trading circles before the usefulness of rivers as highways of transport had been somewhat diminished by the construction of numerous railways.

Below the Ohio junction the alluvial plain of the Mississippi expands to a great width, and so numerous are the channels here ramifying between the fluvial islands that the river looks as if it were already striving to create a delta. As far as the Red River confluence there occur over a hundred of these large islands, which, to save the trouble of giving them special names, were formerly indicated by their number in regular order. But the islands are not "constant quantities," and the numeration becomes so confused that it would have to be annually revised. The insular tracts are subject to changes and displacements, according to the height of the waters and the direction of the currents. At one time a tongue of land is

swept away, at another is transformed to an islet, or else raised by alluvial deposits to a temporary headland. A willow branch or a snag is arrested by a sandbank, fresh sediment and seeds are deposited with every inundation, and the bank thus created is in a few years overgrown with willows or poplars, whose upper foliage is disposed in successive stages, enabling the observer to determine exactly the age of each recurrent growth. Elsewhere an island of recent formation is suddenly washed away, or else of a wooded tract all is submerged except a few green branches waving wildly on the surface.

An example of the rapid formation of these alluvial lands and of their still

Fig. 103.—Meeting of the Waters in the Centre of the Mississippi Valley.

Scale 1 : 3,600,000.

more rapid effacement is afforded by the history of the steamer *America*, which foundered in the river 100 miles below the Ohio ferry, and which was soon covered with a sandy deposit. The ground acquired consistency, trees took root and developed into thickets, which for nearly twenty years supplied fuel to passing steamboats. A farmstead had even been established on the spot, when two successive freshets swept away all trace of the island. The hull of the vessel, thus again exposed, was found at a depth of 40 feet, no longer close to the bank where it had stranded, but in the middle of the current half a mile from the shore.

The whole region of low-lying plains which stretches west of the Mississippi below Cairo, and for a distance of about 125 miles north and south, is studded with lagoons and morasses, and traversed by sluggish streams, which any casual snag suffices to arrest, and which cut themselves fresh channels in the loose soil right and left of the obstacle. It is commonly asserted that this "Sunk Country," as these half-submerged lands are called, suddenly subsided during the earthquake of

Fig. 104.—Sunken Lands.
Scale 1 · 625,000.

1812, which overthrew the settlement of New Madrid, the Nueva Madrid founded by the Spaniards on the right bank of the Mississippi, perhaps in the hope of one day here establishing the metropolis of their North American possessions beyond Mexico. According to the traditional accounts of the local seismic disturbances, the shocks felt on this occasion were amongst the most violent ever recorded. Hills are said to have been swallowed up, while fissures several leagues long were suddenly opened in the ground, and filled with water.

These accounts, however, which were handed down from mouth to mouth, but which were confirmed by no serious observation in a district at that time almost uninhabited, may well be suspected of great exaggeration. Nevertheless, one fact is certain. At the north-west angle of the State of Tennessee the landslips which blocked the course of the Reelfoot River caused the rapid formation of a lake over 40 square miles in extent, and this basin still exists, encircled partly by woods, partly by marshlands.

Even before the earthquake of 1812 the Sunk Country was a region of lakes and swamps, a kind of inland delta, whose thousand branches served as natural regulators of the river between the high and low water seasons. The overflow expands laterally over this low-lying district, all the flooded depressions thus becoming temporary reservoirs, where the current is extremely slow. On reaching the marshlands it continues to fall towards the lower levels; but being arrested by snags and matted vegetation, it loses all its initial force, returning after several weeks, or perhaps months, to the Mississippi or some of its affluents, when the main stream has fallen to its normal level.

The common emissary of all these floodwaters spread over the Sunk Country and other low-lying tracts is the Saint Francis River, which, throughout the whole of its lower course, is nothing more than a bayou of the ramifying Mississippi waters. The extent of alluvial lands and muddy tracts enclosed between the two watercourses is estimated at about 4,000 square miles. Thanks to the controlling action of the temporary reservoirs the floodwaters are gradually diminished, so that during the inundation the Mississippi discharges a much smaller volume near its mouth than it does at the Ohio confluence, 1,250 miles higher up. Despite the contributions of the affluents on both sides, it loses one-fifth of its total mass during its seaward course, and at New Orleans the discharge at high-water level is less than at Saint Louis.*

The Arkansas, which its discoverer, Joliet, had named the Rivière Bazire, joins the Mississippi about midway between the Ohio and Red River confluences. It is by no means such an imposing watercourse as might be supposed from its tracing on the map. Although over 2,000 miles long, it is not copious enough to remain navigable throughout the whole year, and steamers are often arrested even at its mouth. The rains that fall on the thirsty western prairies are insufficient to maintain a large body of water at all times.

Like the Missouri, the Arkansas takes its rise in the heart of the Rockies, west of "South Park," an elevated valley, which is dominated by the boldest summits of Colorado, Lincoln in the north-east and Harvard in the south-west.

Flowing at first south and then east through deep gorges, the Arkansas has already descended two-thirds of its total incline when at Pueblo (4,700 feet) it escapes from the highlands, and winds through the western prairies to the con-

* Discharge of the Mississippi during the floods:—

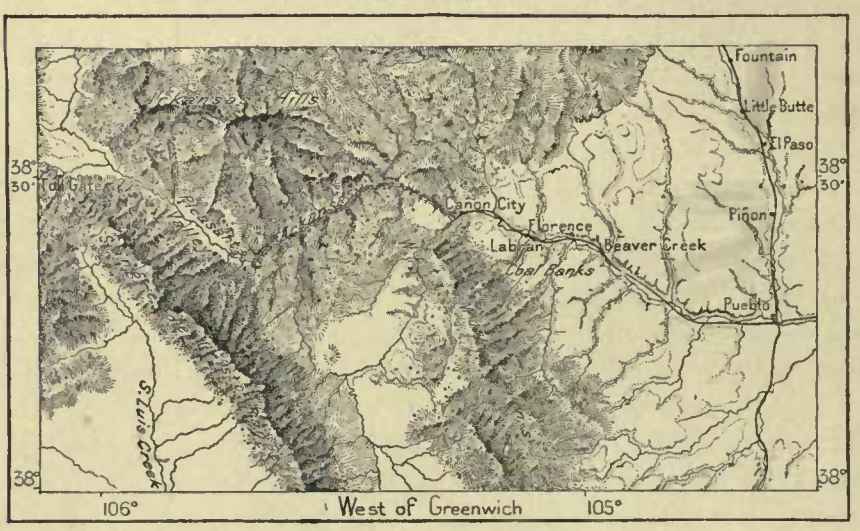
	Cubic feet.
At Cape Girardeau above the Ohio confluence	1,200,000
At Belmont below the Ohio confluence . . . . (more than)	1,223,000
At New Orleans	995,000 (Ellett).

fluence. Traversing a region analogous in formation, slope and climate to that of the Missouri, it also describes a curve roughly parallel with that of the great river of the northern plains; its affluents also, the red Cimarron and the Canadian River, which rises amid the lavas, resemble such tributaries of the Missouri as the Platte and Kansas. Like them, they ramify as shallow streams through a sandy bed between banks wide apart from each other, and also enclosing fertile and naturally wooded bottom lands.

Those flat watercourses are navigable only for canoes, and before the spring rains, the traveller, Boone, found the bed of the Canadian quite dry 750 miles from its source, that is to say, a distance equal to that on the Danube from its headwaters to Buda-Pest. The explorer, Gregg, wandered about for several days in search of the Cimarron, aptly named the "Fugitive" by the first Spanish travellers, because it often disappeared, leaving little trace of its presence.

Fig. 105.—Cañon of the Arkansas.

Scale 1 : 1,350,000.



One of the affluents of the Canadian, which owes its name to the Franco-Canadian trappers, has been called the Dry River, because the stream flows invisibly beneath the sands of its broad bed. At night a few sheets of water may be found in the cavities, but they soon evaporate in the heat of the sun. In certain places the sands are dangerous to cross, being almost as liquid as the underground current. West of 100° west longitude, and thence to the Rocky Mountains, nearly all the watercourses are slightly brackish.

As it approaches the Mississippi, the Arkansas enters a low-lying district similar to the Sunk Country, and is here joined by the ramifying channels of a stream descending from the north which is formed by the junction of the White and Black Rivers. Here also in a delta common to the Mississippi, Arkansas and White River, an equilibrium is established between the several confluents according to the relative rise and fall of the floodwaters in the three basins.

On the opposite side of the Mississippi the plains facing the confluence belong to the basin of the Yazoo, which, though of small extent, is two-thirds as copious as the Arkansas.* The Yazoo is formed by the junction of numerous sluggish bayous, wandering over a district which appears to have formerly been the bed of a lake. One of these bayous formerly branched off at an opening in the Mississippi bank known as Yazoo Gate, and joined the Sunflower affluent of the

Fig. 106.—Upper Valley of the Canadian River.

Scale 1 : 825,000.

Yazoo, and then the Yazoo itself, doubling its volume and ultimately returning to the Mississippi some 300 miles below the Gate. But in order to reclaim and bring under cultivation the enclosed district from above, some planters closed this Gate by an enormous embankment, the strongest along the whole course of

* Yazoo mean discharge . . . . . 43,000 cubic ft. per sec.
Arkansas „ „ . . . . . 63,000 „ „ „

the Mississippi. Since that time, however, the streams farther down have become so shallow that all navigation is nearly obstructed for months together.

Semicircular and even almost completely circular windings are very numerous along the whole course of the Mississippi; but they nowhere form a more regular and continuous system than in the lower section of its middle course between the Arkansas and Red River confluences. It often happens that vessels sailing with the current for a long détour of several leagues find themselves not far from, and still in sight of, the point they may have left hours before. Meanderings of 15 or even 20 miles, such as those of Terrapin and Palmyra bends, leave a space of less than 500 yards to the isthmus separating the upper from the lower loop.

Hence the narrow stem has often been pierced through and through by the stream itself, which thus suddenly completes the unfinished ring. Then the current, ceasing to describe a great bend, rushes swiftly through the new channel. The ends of the old channel are quickly filled with silt and the old bed is left a mere crescent-shaped lake of stagnant water. To such lakes Shaler has given the name of *moats*, comparing them to the abandoned ditches enclosing some ancient fortress. The cutting of the isthmus is usually completed, not from the side of the upper curve, whence the stream descends, but from the lower, whence the water plunges over an abrupt fall. On this lower side the erosion is accomplished with amazing rapidity by the excavation of the bank cleared of all support from above; when it gives way many acres of land disappear in a few seconds, with a thundering noise like a salvo of artillery.

But several days pass before steamers are able to stem the powerful current of the short cutting. Most of the new beds thus formed, since the banks of the Mississippi have been known to Europeans, have been opened without any artificial aid. Such is, for instance, the *Horseshoe Cut-off*, which was formed in 1839, some distance from the mouth of the Arkansas, and which saved a détour of 30 miles.

Other channels have partly an artificial origin. Such are in Louisiana, the cuttings which still bear their French names, "Pointe-Coupée" and "Raccourci." At first sight it might seem simple enough in this way to rectify the sinuous course of the Mississippi, and thus shorten its navigation. But the equilibrium of the stream is regularly established on both sides of the valley, so that the windings suppressed in one place reappear elsewhere, and the short cuts gained at one point are soon lost at another. It is evident from the general aspect of the Mississippi depression, with its living current flowing between numerous extinct lateral streams, that the river has never ceased to oscillate from right to left, with a continuous undulating movement. Islands are transformed to peninsulas, which are then shifted from side to side, and consequently also transferred from one political territory to another. Thus the island No. 92, forming part of Arkansas, was removed by the action of the river to the opposite state. Still more curious is the happy condition of No. 74, some 4,000 acres in extent, which belongs neither to the one nor to the other, so that its owner pays no taxes.

This shifting character of the stream, like a snake continually coiling and uncoiling itself, explains the appearance of its banks. The traveller who has

traversed the primeval forest can alone form some idea of the silence that reigns along the middle course of the Mississippi. It is generally supposed in Europe, and even in New England, that the riverine tracts are cultivated, and dotted over with an uninterrupted line of hamlets and villages. But it is not so. Forests, willow-grown islands, spits of sand follow in wearying monotony, and the traveller may journey for days together without seeing a trace of human habitation on the

Fig. 107.—Mississippi-Arkansas Confluence.

Scale 1 : 475,000.

——— Dyke.

The old site of Napoleon is now under water.

——— 6 Miles.

lifeless shores of the great artery. Puffing steamers are met, with their crowds of passengers, for a moment filling the void with stir and noise, and heightening by contrast the stillness of the mysterious riverine woodlands.

The banks themselves are stable only in few places, and rarely offer a firm footing to man and his works. Ever since the scientific exploration of the Mississippi has begun, all travellers, and especially Lyell, have noticed that the right bank below the Ohio is formed exclusively of alluvial deposits, whereas

the left side is skirted by bluffs. At one point alone, not far from the mouth of the Saint Francis, the river approaches the hills on its right side near enough for the observer to distinguish the forest-clad heights in the distance.

On the east side, on the contrary, the current impinges fifteen times on rocks of eocene origin, the so-called "écores" of the early French pioneers. Each of

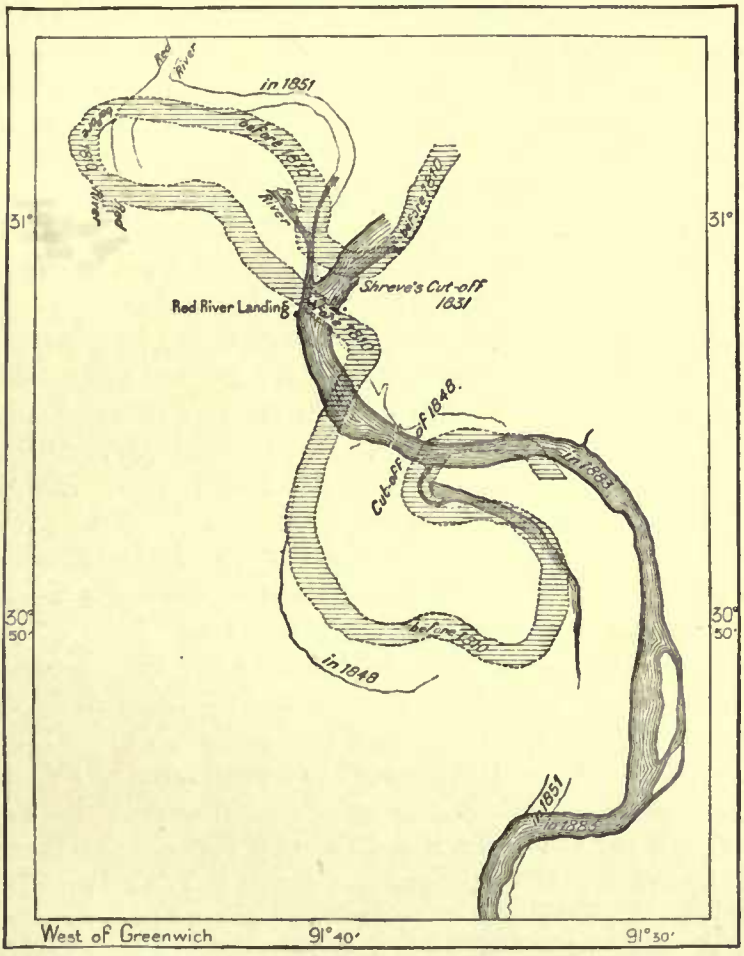
Fig. 108.—Windings of the Mississippi above Greenville.

Scale 1 : 350.000.

these bluffs, with their red escarpments furrowed by the rains, has afforded a solid foundation for farmsteads, villages, and towns. Here and there occur a few ruins, ancient military stations of the Indians or whites, to which the present inhabitants give the general name of *Soto camps*, as if to credit all these works to Hernando de Soto, the first European who crossed the Mississippi.

It might seem natural for the Mississippi to encroach rather on its right bank, for the simple rotatory movement of the earth round its axis should, in fact, unless neutralised by influences acting in the opposite direction, tend to deflect the course of the river to the right, as it does that of the Volga in Europe and of the Indus in Asia. Such, however, is not the case, and the Mississippi delta is, in fact, displaced some six degrees to the east (left) of the lake at its source.

Fig. 109.—"Cuts-off" of the Mississippi at the Red River Confluence.
Scale 1 : 250,000.



The cause of this apparent anomaly must be sought in the original structure of the continental mass itself. In their general incline rivers necessarily follow the slope of the land through which they flow. Thus the Alabama trends south-westwards in a line with the terminal valleys of the Appalachian system, while all the Texan watercourses follow the tilt of the plains skirting the foot of the Rocky Mountains. In the same way the Mississippi, confined to the central depression of North America between the two lateral orographic systems (Appalachians and Rockies), has been most powerfully influenced in its general

course by the more powerful of these two systems. The whole space comprised between the Rockies and the main stream may be regarded as a vast talus or sloping mass of detritus, the base or eastern scarp of which is skirted by the Mississippi on its course to the Gulf of Mexico.

Some 300 miles from the sea the beginning of the delta region is indicated by the confluence of the Red River. This great affluent, which flows parallel with the Canadian, Cimarron, and Arkansas, and which was formerly confused with a Rio Colorado tributary to the Canadian, does not rise, like these watercourses, in an upland valley of the Rocky Mountains, but in a fissure of the Llano Estacado (Staked Plain). Here it rises in the bed of a cañon, at an absolute height of 2,600 feet, and about 650 feet below the encircling wall of overhanging rocks. Flowing eastwards, the stream escapes through this gorge to the open plains, where it is joined by several other rivulets which, like it, are nearly all brackish.

Occasionally its sandy bed remains quite dry for some hundred miles from its source. But after the junction of the False Washita, the Red River becomes a perennial watercourse, although not yet navigable. After receiving several other tributaries, it trends round to the south, and here enters a low-lying region, which is studded with large depressions, and which is at times covered by the flood-waters.

The barrier, however, by which river and lakes are here dammed up is not a rocky ledge or sill, but a prodigious quantity of snags jammed together in an impenetrable rampart. This vast accumulation of driftwood, the "embarras" of the French Creoles, is called by the Anglo-Americans a "raft," although it does not float, but blocks the river-bed through its entire depth, leaving the water to escape right and left. It consists, in fact, not of a continuous compact rampart, but of some fifty or sixty solid heaps, each several hundred or even thousand yards long, with intervening stretches of stagnant water. With every recurrent inundation the stream brings down fresh trees, which are intercepted by the "raft," the accumulated mass thus continually growing larger on the upper side, while lower down a few snags are detached from time to time.

Thus the obstruction, increasing upwards, advances incessantly up stream, like a floating embankment. In 1858 the upper front had ascended the main stream a distance of 390 miles above the Red River and Mississippi confluence, having advanced 30 miles since 1833, or at the mean rate of $1\frac{1}{4}$ mile a year. The pent-up lakes are in their turn also pressed upwards, flooding prairies and woodlands as they advance inland. The vast space now occupied by Caddo Lake, about the north-west corner of Louisiana, was at the end of the last century still prairie, over which the Indians hunted the bison.

Thus the whole aspect of the land has been permanently modified, and in certain places the decayed snags, having lost their woody texture, became transformed to vegetable humus, which supported a fresh growth of forest trees. In order to restore the navigation, the Louisiana Government began in 1828 a project for clearing away the barriers, which at that time obstructed the river for a distance of about 125 miles. These had been gradually reduced to one-tenth of their original length when operations were interrupted by the Civil War. After

the war the operations were resumed, but restricted to the work of cutting a direct navigable channel through the solid mass of snags. This work was completed in the fall of 1873.

In the Mississippi itself old beds completely obstructed by trees have been abandoned by the river, which has opened new passages elsewhere. But no fresh barriers are here formed, although the trunks of trees still continue to drift down during the floods. But all the larger stems are captured by the saw-mills established at intervals along the banks, and in the lower regions nothing remains except branches, herbage and reeds. Thus the bed of the river is kept clear of the snags or "sawyers," as they are locally called, which formerly grounded and became embedded in the mud, half hidden by the turbid waters, and a constant source of danger to passing vessels.

Below the raft the Red River still develops near Alexandria some little rapids, which are difficult to surmount during the dry season. Farther on it is joined by the Washita, or Black River, a short distance above the point where its brownish current intermingles with the yellow waters of the Mississippi in a labyrinth of channels. But in geological history the Red River is only a temporary affluent of the Mississippi. At a former epoch it probably failed to reach the right bank of the main stream, but flowed at a distance of about 60 miles to the west directly to the Gulf of Mexico through the broad bed which is at present occupied by the Tèche bayou.

The Washita, with its lower course, the Black River, also flowed in an independent channel southwards, reaching the sea through the bed of the Atchafalaya bayou. But the incessant shifting of all these watercourses ended by uniting them in a vast network of bayous. Like a knot gathering up the stems of three ramifying branches, this intricate system of channels connects the Mississippi with the neighbouring rivers, and marks the precise spot where the waters of the three streams again diverge in separate beds towards the sea.

Nevertheless, the three watercourses have not become absolutely intermingled, but still show a tendency again to resume their former independent courses. Thus the Red River no longer communicates with the Mississippi, except through a broad passage, which has received the name of the "Old River," and which would soon become unnavigable but for the incessant labour of the engineers. Even so, mudbanks have frequently closed the entrance of the Red River to steamers from the Mississippi. It has been proposed to arrest the Atchafalaya affluent by means of an embankment, and thus divert the waters of the Red River into the junction canal. But all calculations are upset by the uncertain character of the inundations. Occasionally the Mississippi discharges a portion of its flood-waters through the Atchafalaya, as if the river were in quest of the shortest route seawards.

The number of bayous in the Mississippi delta which flow directly seawards without returning to the fluvial bed changes from century to century. Besides the main stream itself, the present branches of the delta above the group of terminal mouths, or "passes," are the Atchafalaya, Plaquemine, and Lafourche

bayous. Others have been effaced by the riverine populations anxious to reclaim the land, and make it suitable for cultivation by drainage works. The Atchafalaya branch is the largest of the three still open, all of which ramify to the right of the main stream, winding from lake to lake, from swamp to swamp, on their sluggish courses to the shallow waters of the gulf, west of the passes.

Formerly another large affluent, the Iberville bayou, ramified on the opposite (east) side of the Mississippi, flowing seawards through Lakes Maurepas and Pontchartrain, and discharging a large volume of water during the winter season. This channel might have acquired some importance as a commercial highway had care been taken to keep it open; but it is now obliterated, except during the periodical floods. It had already been partly obstructed by the "embarras" of snags, when General Jackson had it closed some time before the battle of New Orleans, to prevent the English from penetrating through this branch into the Mississippi, and then descending with the current on the capital of Louisiana.

From Cairo to its delta the Mississippi steadily diminishes in width according as it approaches the gulf. Between the Ohio and Arkansas confluences the mean width is about 1,500 yards between banks; between the Arkansas and Red River the width is reduced to 1,370 yards; between the Red River and the Lafourche bayou to 1,000 yards; lastly, from the Lafourche bayou to the head of the passes, the Mississippi shrinks to a width of 800 yards.

On the other hand the depth continues to increase in the same direction throughout the whole of its course. In the section from the Ohio to the Arkansas the river bed rises here and there to less than 10 feet at the reefs; but the mean depth ranges from 50 to 85 feet, and in the lower reaches between the Yazoo and the passes, from 110 to 120 feet. At the foot of the Grand Gulf bluff (a corruption of the French "Grand Gouffre") the lead reveals a depth of no less than 200 feet. Thus the increase of depth about suffices to compensate for the decrease in width, so that the volume remains the same.

On the alluvial plains of the Mississippi nothing is visible except water, mud, and the rich loam deposited by the freshets. Humphreys and Abbot believed that the bed of the fluvial plain below the overlying alluvia consists of a tenacious clay "nearly as hard as marble," and probably dating from a time anterior to the eocene epoch. According to them the broad expanse, 70,000 square miles in extent, stretching from Cape Girardeau to Baton Rouge above New Orleans, has not been formed by later deposits, but would appear to belong to an older formation.

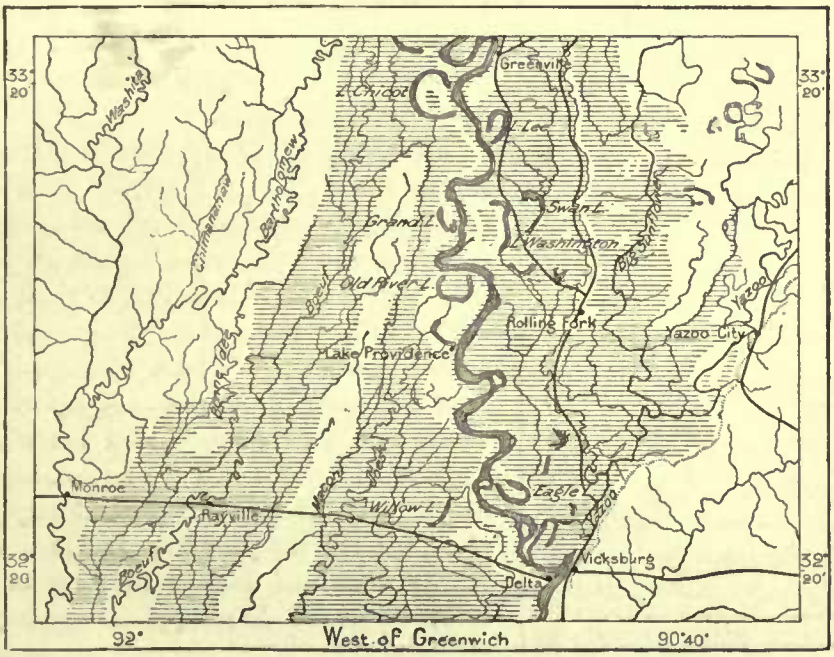
Nevertheless the numerous soundings and borings made in the bed and along the banks of the river show that this clay is of the same origin as the overlying sedimentary matter. Both formations are alike the creation of the Mississippi, though geologists have not yet been able to say how many long ages have elapsed since the first deposits were made. An artesian well sunk at New Orleans to a depth of 580 feet has penetrated exclusively through alluvial strata, clays, and sands, with trunks of trees embedded in the mud. The great marine depths, also, that have been revealed by the soundings taken south of the passes make it evident that the quantity of silt brought down by the Mississippi is far greater

than that determined by the borings. Collectively, the delta may perhaps represent an alluvial mass 1,600 feet thick.

Other borings undertaken for the construction of some gasworks have revealed ten successive strata of ancient forest, and in one of these a human skeleton was found associated with bits of charred wood at a depth of 16 feet. The naturalists who have examined the fossil shells and plants brought up from the lower clays have, with some doubtful exceptions, identified them with organisms still living in the surrounding waters; they were obviously deposited in front of the delta before the Mississippi had advanced its mouths farther seawards.

The fine clays of the delta region, being less friable than the coarser sands higher up, serve for the construction of lateral levees or embankments; these

Fig. 110.—Flooded Region between the Arkansas and Yazoo.
Scale 1 : 1,700,000.

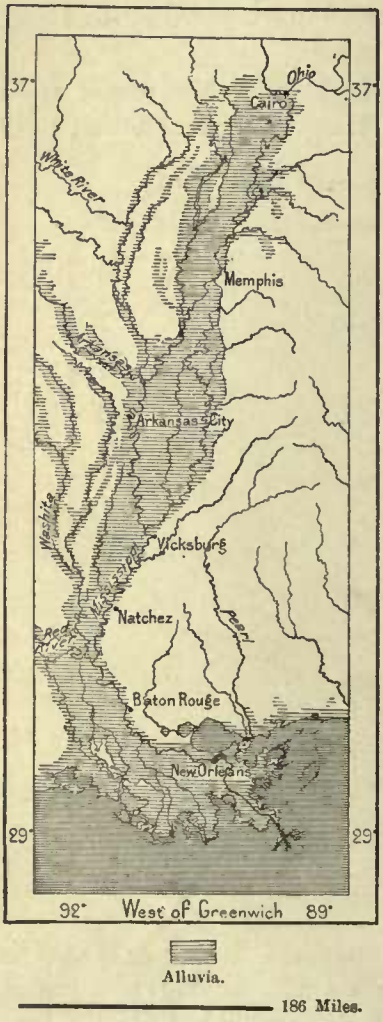


works hold out well against the pressure of the inundations, so long as the top is not reached by the waters, or pierced by the crayfish, or the base eroded by the underwash of eddies. All attempts must have failed to bring the low-lying alluvial plains under cultivation had they not been first protected by such works. The first ramparts thrown up around New Orleans date from 1717.

These dykes or levees, ranging in mean height from 10 to 16 feet, but higher and strengthened by advanced earthworks at the dangerous points, skirt both sides of the river for a total distance of some thousand miles. Along the right or lower bank they form an almost continuous rampart from Cape Girardeau to and beyond New Orleans. On the left bank, which is here and there flanked by bluffs, the line of levees scarcely extends northwards beyond Tennessee.

But these dykes, till recently constructed by the different states without any general plan, are themselves the cause of disasters. They prevent any overflow into the marshy riverine tracts, so that in exceptionally wet seasons the swollen floodwaters never fail to find some weak point at which they break through into the surrounding plantations. Forty-five crevasses occurred in the embankments below the Saint Francis in 1858.

Fig. 111.—Mississippi Alluvia.
Scale 1 : 9,000,000.



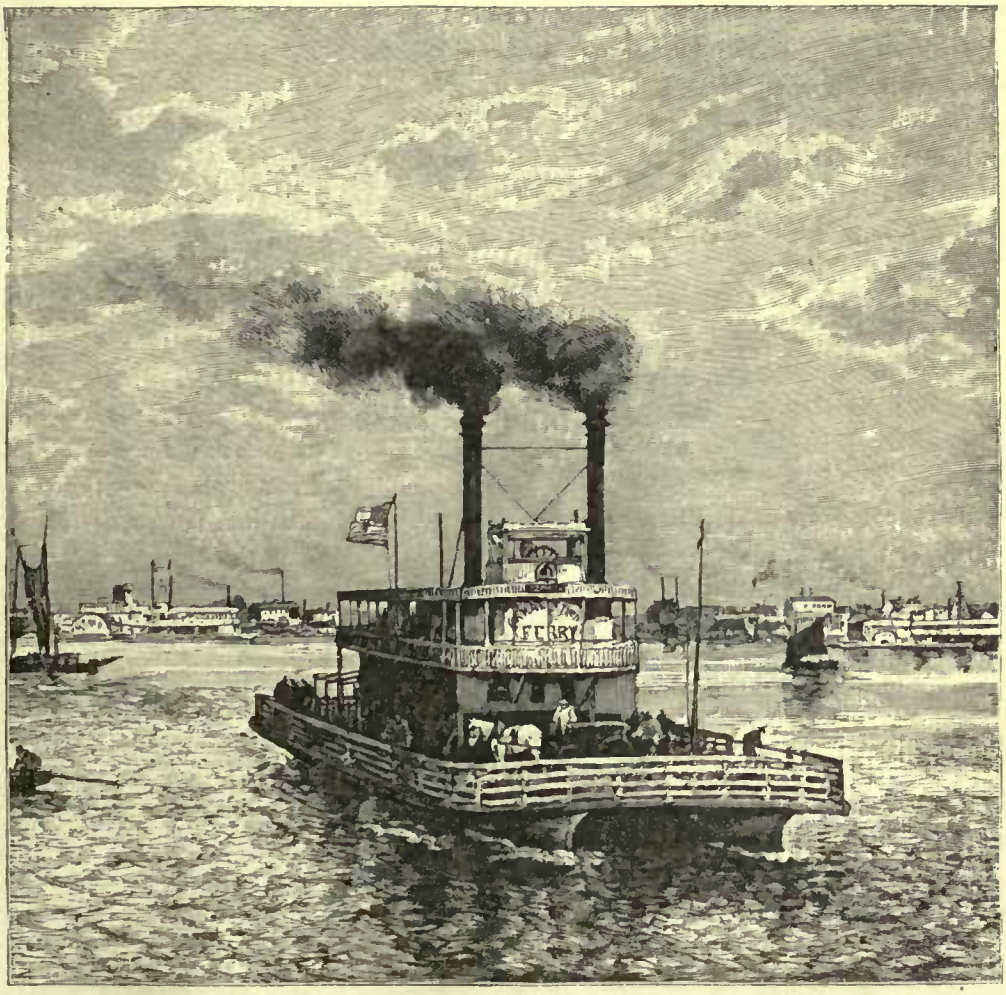
The history of these "crevasses," as they are locally called, is the history of the public calamities of Louisiana. How often has the Mississippi burst its artificial fetters, and laid the low-lying arable lands under water while seeking fresh channels for its overflow! Thus the Bonnet Carré crevasse, which was formed in 1850, was reopened in 1859, when the stream rushed through at the rate of 106,000 cubic feet per second, a volume greater than the normal discharge of the Rhone.

The freshet of 1874 opened fifteen crevasses, and in Louisiana over 2,500,000 acres under cotton, sugar, and maize disappeared beneath the floods. Above Louisiana the plain has also at times been inundated from bluff to bluff, and in 1890 the whole valley of the Yazoo was transformed to a temporary lake. The inundations covered a space of about 68,000 square miles, 10,000 square miles more than the whole of England and Wales, and the mounds raised by the vanished Indian tribes were the only places of refuge for the peasantry and their cattle. Similar disastrous floods took place in May, 1892, when the Mississippi at some points expanded to an inland sea, from ten to twenty miles wide.

The levees cease with the arable lands, beyond which the tracts lying too low to be cultivated have no need to be protected, at least until they are raised by the yearly deposits of the floods. Meanwhile the Mississippi already flows, one may say, in the Mexican Gulf beyond the shore line of the mainland. The narrow alluvial peninsula which here serves to form its banks tapers continually southwards, so that the two fluvial banks become simple marine beaches, washed by the waves. From the deck of a passing steamer the traveller easily perceives that he is following the course of a freshwater stream flowing in the open sea, while the true coastline, left far behind, at last disappears altogether.

Farther on the channel of the Mississippi expands over a polygonal basin, where it ramifies into several branches forming the so-called *patte d'oie* (Goosefoot). All these passes, as they are locally called, are separated by intervening bays or inlets, whose shores are much narrower than those of the main stream above the point where they ramify in all directions. In some places the beach is scarcely a hundred yards wide, so that in rough weather the waves dash over these slender

Fig. 112.—Steam Ferry on the Mississippi.



barriers into the fluvial channels. On the banks nothing grows except tall reeds (*Miegea macrosperma*), whose fibrous roots give a little cohesion to the mud. Farther on even these growths disappear, and then the fluvial channels can be followed only by the lines of their brownish mud banks which are continually modified by the action of waves and currents.

Above the diverging point of the passes there has already been formed a small lateral mouth, which branches off from the right bank, and which has been called the "Jump," from the rapidity with which the current forced its way through its

outlet. But excluding the Jump, utilised by the fishermen engaged on the oyster beds of the neighbouring Barataria Bay, and a few smaller openings a little higher up, there are only five passes properly so called, South-West Pass, South Pass, South-East Pass, North-East Pass, and Pass à l'Outre, this last a ramification of the North-East Pass. They have all a somewhat swifter normal current than that of the main stream between New Orleans and the point of divergence.

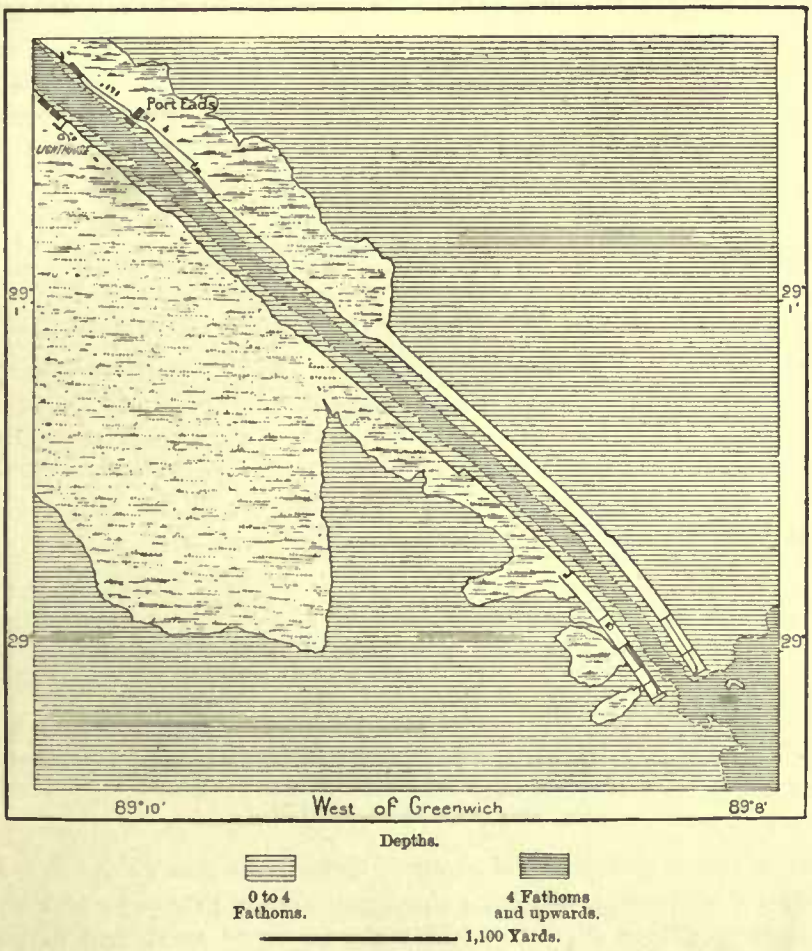
As long as the river was left to itself without the interference of man, each in its turn became the true mouth or navigable waterway of the Mississippi. The main stream shifted incessantly from one to the other, according as it became and again ceased to be the shortest and most rapid seaward channel. During the early essays at colonisation in Louisiana the South Pass was the chief branch; then followed North-East Pass, where was founded the village of Balize. But this mouth became in course of time so obstructed that it ceased to be navigable except by vessels of light draught. After 1845 the South-west Pass, where the pilots had also "moored" a village to the shifting mudbanks, remained for over thirty years the chief entrance for large vessels, while the Pass à l'Outre became the natural waterway for smaller craft plying between New Orleans and Havana. Now, however, engineering operations have restored the pre-eminence of the South Pass, which henceforth remains the principal approach to the fluvial basin.

The bars, or submarine banks of alluvial matter deposited between the river mouths and the marine depths, vary constantly in form and elevation according to the force and abundance of the currents which here meet, and which, by the collision, cause the sediment to be precipitated. Long observations have established the fact that to the marine currents is due the deposit of the fine particles of clay contained in the Mississippi waters. Being heavier than the fresh water of the river, the marine currents penetrate beneath its yellowish stream, constantly purifying it by causing the clayey particles to fall in a continuous shower. The sediment thus precipitated is at first of but slight consistency, so that vessels have often succeeded in crossing the bar, though their draught greatly exceeded its depth, sometimes by as much as from six to seven feet. Even sailing-vessels have thus succeeded in forcing their way through the obstacle into the river under the influence of a favourable wind. But for many years the work has been accomplished mainly by the aid of steam. The tugs engaged on this service are continually darting out, taking stranded vessels in tow, and drawing them with much snorting and puffing through rather than over the bar. In the river large vessels may be seen lashed together in fours and stemming the current apparently under the influence of some mysterious force. But the puffs of smoke and the muffled rumblings of groaning engines betray the power by which they are propelled.

On various occasions the normal condition of the bars has been suddenly disturbed by the appearance of the so-called "mud-lumps," cone-shaped mounds of clay, some approaching the surface, others rising as high as 18 or 20 feet above it, and covering a space of about 30 acres. Their formation is due to the fermentation of the organic remains brought down by the current and then covered by sedimentary matter.

The salt and sulphur beds that have been discovered in the islands near the delta are perhaps connected with the chemical reactions to which is due the formation of the argillaceous cones. In one of the rocksalt-mines worked by the inhabitants of Petite Anse, near Vermilion Bay, a reed mat associated with the remains of a mastodon was found at a depth of 20 feet below the surface. The sulphur beds of Calcassieu, near the river of like name, lie at a depth of 440 feet, resting on the chalk; the shaft here sunk pierced through oil-bearing strata.

Fig. 113.—The South Pass.
Scale 1 : 40,000.



At present the South Pass, chosen by the engineer Eads as the chief permanent entrance to the Mississippi basin, is continued seawards by means of parallel jetties. The marine bed, which had an average depth of not more than eight feet, has been maintained for several years at a depth of over 30 feet, and now gives access to vessels of the heaviest tonnage. Thus the port of New Orleans, formerly of very difficult approach, has become one of the safest in the New World. Since the completion of the works the ballast discharged by vessels in large quantities along the jetties has been utilised to form in the midst of the slush

and water a solid granite foundation for the erection of a new town, which has been named Port Eads in honour of the engineer.

The Mississippi catchment basin comprises a superficial area estimated at about 1,244,000 square miles, over ten times that of the British Isles, and very nearly seven times that of France. From the main source of the Missouri to the mouth of the Mississippi at Port Eads the total distance is approximately given at 4,200 miles, or as far as from the equator to the centre of Greenland. The volume varies with the seasons, but the change of level and consequently the discharge follow, generally speaking, a normal course throughout the year.

Towards the 1st of December the river begins to rise, and its volume continues

Fig. 114.—Mississippi-Missouri Basin.
Scale 1 : 30,000,000.

to increase till about the middle of January, that is, the time of the first floods. Then the level falls slowly, remaining about stationary in February and March.

In April and May the Mississippi again begins to swell, and during the month of June attains its highest level with the great floods. These are much dreaded, and are more sudden at present than they were at the beginning of the century, owing to the destruction of the surrounding woodlands and the draining of the arable riverine lands.

Immediately after reaching high-water mark the floods begin to subside rapidly till the end of September, the river reaching its lowest level in November. Between Cairo and the Red River confluence the difference of level varies from about 51 to 40 feet, whereas at New Orleans it is scarcely more than 14 feet.

According to the greater or less abundance of the rainfall, the total discharge may increase or diminish in the proportion of one to four, say from 350,000 to 1,400,000 cubic feet per second. The average is about 675,000 cubic feet, representing one-fourth of the total rainfall in the vast space stretching from the Rocky Mountains to the Appalachians.

According to Humphreys and Abbot's chart, which embodies the results of the meteorological observations recorded in every part of the Mississippi slope, the rainfall of the whole area is estimated at 89,390 billions of cubic feet, equivalent to a sheet of water 30 inches deep.*

Of all the great rivers of the world the Mississippi is the most utilised for internal navigation and general traffic. Nevertheless it has already been deprived of more than three-fourths of its normal carrying business by the railways connecting the riverine towns with the Atlantic seaports. Hence much smaller watercourses, such as the Hudson and the Rhine, are navigated by a relatively larger number of vessels than the Mississippi. In 1782, when the first vessel, a heavy flat-bottomed barge called "Noah's Ark," descended the Ohio and the main stream from Pittsburg to New Orleans, the custom-house officers at the latter place had never even heard of the city where the goods had been shipped.

With the varying volume of water corresponds a varying quantity of alluvial matter, though this is always sufficient to continue the steady encroachments of the land on the Gulf of Mexico. On an average the Mississippi waters are charged with sediment in the proportion of three to the thousand. Taking into consideration the periods when the river is most turbid, and adding to this floating silt the heavier detritus rolled down the fluvial bed, the quantity of solid matter washed down from the mainland and deposited on the coast or in the gulf is estimated at the 1,430th part of the liquid mass.

The line of demarcation separating the fluvial from the marine current is straight and rigid, as if drawn with a ruler from horizon to horizon. Seen from the

* Discharge of the Mississippi and chief affluents per second, according to Humphreys and Abbot:—

	Cubic feet.	Rainfall of basin. Inches.	Proportion.
Upper Mississippi	105,000	35	0·24
Missouri	120,000	21	0·15
Ohio	158,000	42	0·24
Saint Francis	31,000	41	0·90
Arkansas	63,000	29	0·15
Yazoo	43,000	46	0·90
Red River	57,000	39	0·20
Mississippi	675,000	30	0·25

Mean extent of the navigable waters in the Mississippi basin according to Abert:—

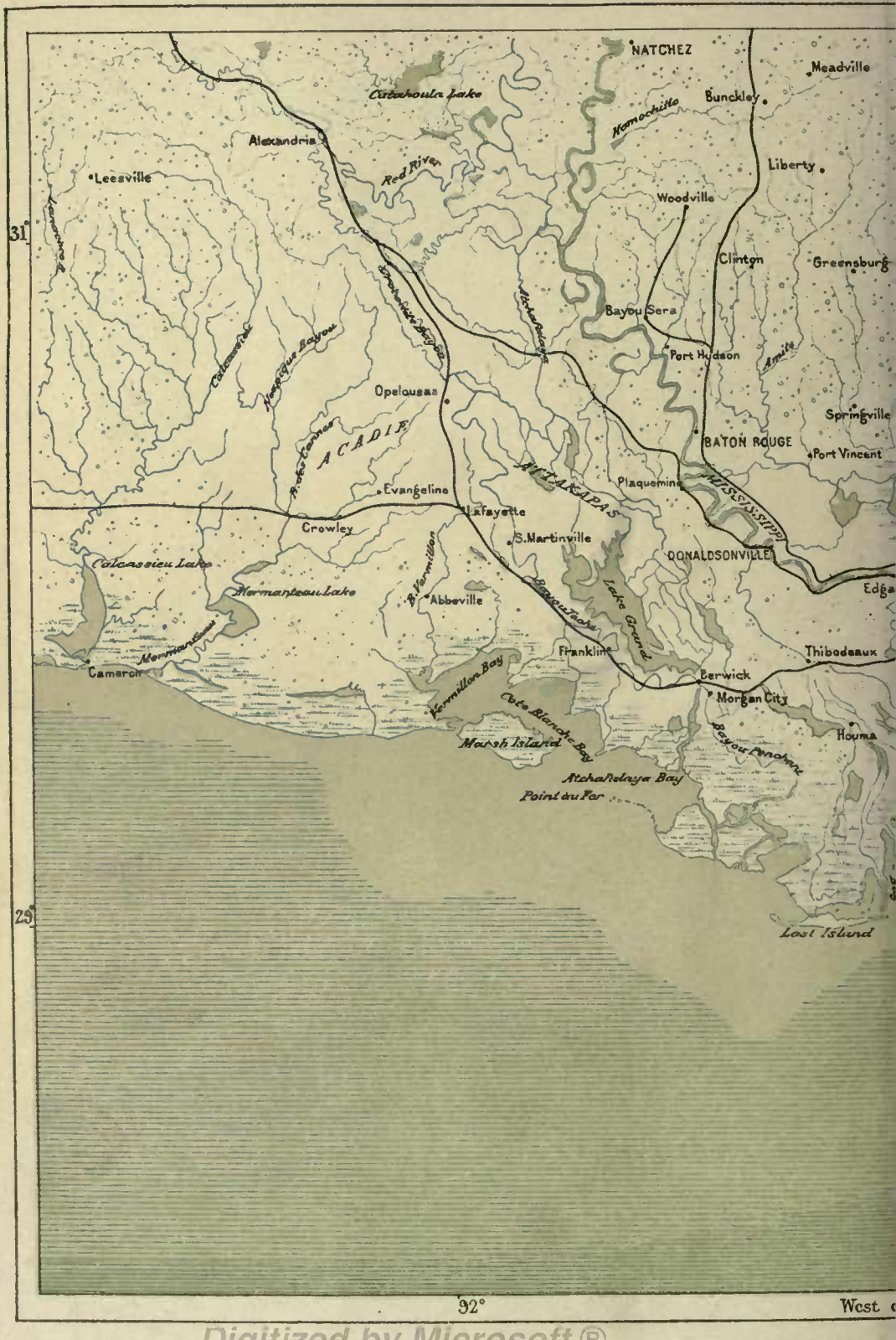
	Miles.
Upper Mississippi and its affluents	1,365
Missouri and its affluents	3,900
Saint Francis, Big Black, Yazoo, affluents and bayous	600
Ohio and its affluents	3,630
Arkansas affluents and bayous	1,620
Red River affluents and bayous	2,455
Mississippi and its bayous	4,180
Total	17,750

Mississippi the expanse of blue marine waters contrasts so sharply with the yellow fluid discharged by the river that it looks like some distant land. On the high sea the turbid surface of the Mississippi, which borders the saline waters on the north, presents the aspect of a dense fog resting on the surface.

The estimates made by various geologists since the time of Lyell regarding the growth of the delta can have but a hypothetical value; for we still know little or nothing of the quantity of silt deposited on the bars, of the extent of the erosion, of the changes that have taken place in the climate and in the hydrographic régime. An attempt, however, may be made to compare the

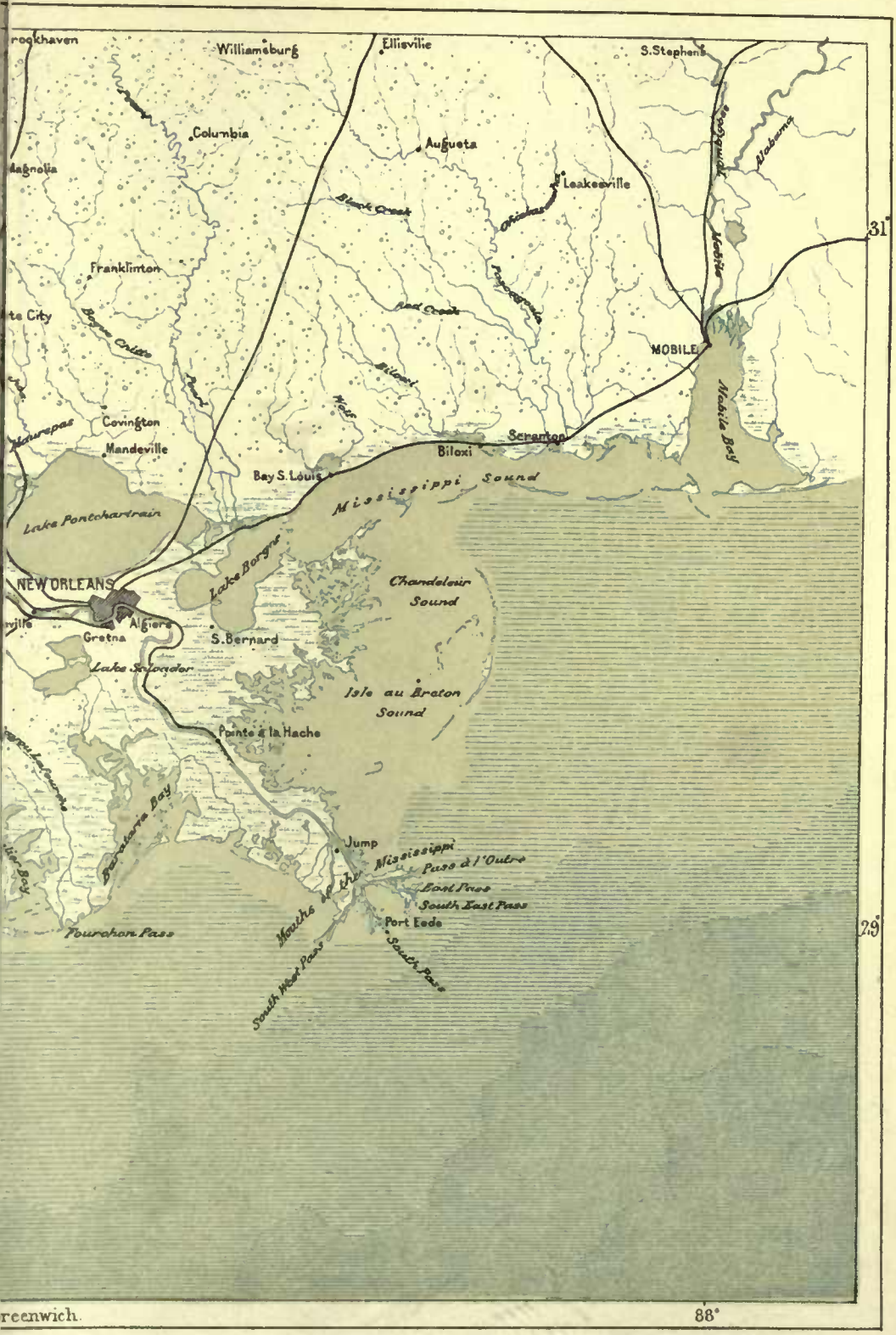
Fig. 115.—Discharge of the Mississippi and its Affluents.

yearly proportion of alluvial matter with the formations known to be of fluvial origin. The quantity of sediment annually washed down by the Mississippi exceeds the fifth part of a cubic kilometer (35,316·6 cubic feet), a mass equivalent to an island about four square miles in extent, and 70 feet high, or, according to Humphreys and Abbot, "a mass one square mile in area and 241 feet deep." But estimating the alluvial loam of the middle Mississippi at not more than 160, and that of the delta at 660 feet in depth, the whole of the alluvial formations from the Ohio to the delta would represent a mass equal to no less than 10,545 cubic kilometers (10,545 by 35,316·6 cubic feet), a quantity equivalent to all the sediment brought down by the river in a period of 50,000 years. Such calculations,



0 to 5 fathoms 5 to 50 50

DELTA.

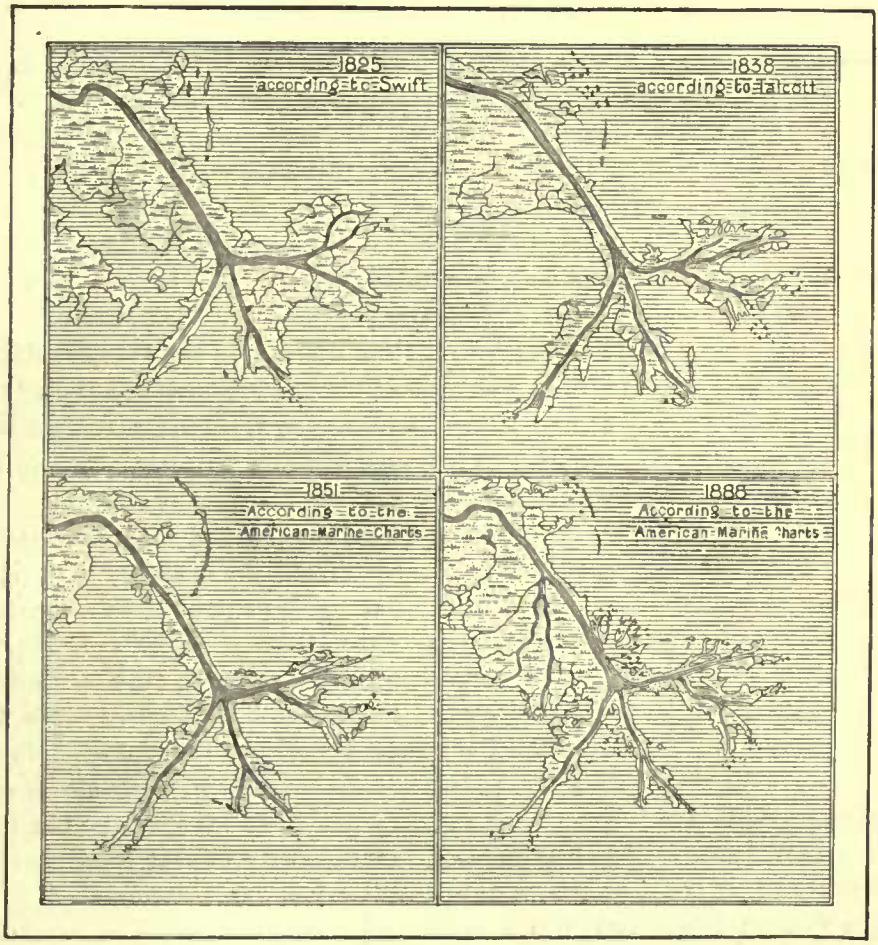


500 to 1,000. 1,000 upwards.

however, based on averages and assumptions, yield widely different results, according to the estimates of different writers.*

In any case from the charts prepared since the epoch of colonisation it is evident that great changes have taken place in the contour lines of the delta. A comparison of Pauger's chart, made in 1723, with that executed by the American Hydrographic Commission in 1851, reveals the fact that during this period the bar advanced some seven miles seaward, or say, at the yearly rate of about 285 feet.

Fig. 116.—Mississippi Delta at different Epochs.



But this rate of progress cannot be accepted as indicating the average annual growth of the delta, for as already seen, the current has shifted from one pass to another, making each in its turn the chief mouth.

All things considered the actual encroachment of the Mississippi delta can scarcely be estimated at more than 60 or 70 feet a year, or about 1¼ mile a century. Moreover, this seaward advance itself must eventually be arrested, for the Mississippi mouths will soon reach the scarp of the deep abyss traversed by the Gulf

* Probable age of the delta according to Lyell, 100,500 years; according to Ellet, 22,220 years.

currents. At a distance of 11 miles from the entrance to the river the marine bed lies 148 fathoms below the surface, and this depth rapidly increases to over 820 fathoms. Here, therefore, all further invasion of the sea by the land must cease, as the matter carried down by the river will be swept away by the Gulf currents without depositing any appreciable quantity on the marine bed.

The South Texan Rivers.—The Rio Grande.

West of the Mississippi delta properly so called, the gulf is reached by a few bayous, which belong rather to the Washita and Red River hydrographic systems, and which flow with deadened current through a labyrinth of coast lagoons and marshes. The first independent river of any importance is the Sabine (formerly *Sabinal*), so named by the Mexicans from the *sabinos*, that is, the "cypress" trees of the French Creoles, which fringe its banks. The Sabine, which long was the political frontier of the United States towards Mexico, is joined by the Neches in the shallow estuary of Lake Sabine. Both rivers, like the other Texan watercourses—Trinadad, Brazos, Colorado, Nueces—flow in the direction from north-west to south-east according to the general slope of the land, which inclines from the foot of the Rocky Mountains towards the Gulf of Mexico.

Drawing their farthest supplies from regions which have but a slight rainfall, these Texan rivers have a correspondingly slight volume, and are consequently of but little economic value as navigable highways. In their upper reaches both the Brazos and Colorado are useless even for irrigation purposes, owing to the saline and gypseous character of their affluents.*

In one section of its course the Colorado is, so to say, paved with pearl oysters, some of which still contain pearls of marketable value. All of these Texan rivers are obstructed at their mouths by difficult bars; nor are any of them sufficiently copious for inland navigation to acquire any serious importance in this region.

The river whose lower course forms the parting line between the conterminous North American and Mexican republics has retained both its Spanish names, Rio Grande and Rio Bravo del Norte. The former, by which it is best known in the United States, is fully justified by the length of its course. Its basin also is very extensive, being about half as large again as the whole of France. But here ceases all claim to the title of "Grande;" in its annual discharge it falls behind many rivers which are greatly inferior to it in length and drainage area.

The farthest headstream, which retains to its very source the name of Rio Grande, rises in a cirque of the Rocky Mountains, whose snowy crests here attain a mean altitude of over 13,000 feet; the culminating point is Pole Creek Peak, 13,400 feet. The nascent stream is separated by narrow ridges from other fluvial

* Chief rivers of Texas:—

River.	Length.	Drainage area according to Gannett. Square miles.	Approximate discharge per second. Cubic feet.
Sabine	450	20,400	17,700
Trinity	530	18,000	7,000
Brazos	910	59,600	15,900
Colorado	840	41,200	10,600
Nueces	385	19,000	3,500

BANKS OF THE SABINE.

valleys, which slope westwards to the Californian Colorado, and north towards the Arkansas. After sweeping round the western and southern slopes of the Pole Creek mass, the Rio Grande escapes eastwards through a succession of deep gorges. Farther on, while still at an altitude of 8,000 feet above sea-level, it enters the so-called San Luis valley, a vast basin of lacustrine origin.

After leaving the desert plain of the San Luis valley, a strange and monotonous arena in an amphitheatre of mountains of varied outline, the Rio Grande trends round to the south. Here it flows in a longitudinal valley between parallel ranges of heights, and descends over a few slight falls by which its general altitude is but

Fig. 117.—Sources of the Rio Grande.

Scale 1 : 340,000.

slightly lowered. At the confluence of the Galisteo, it still flows at a height of 5,300 feet.

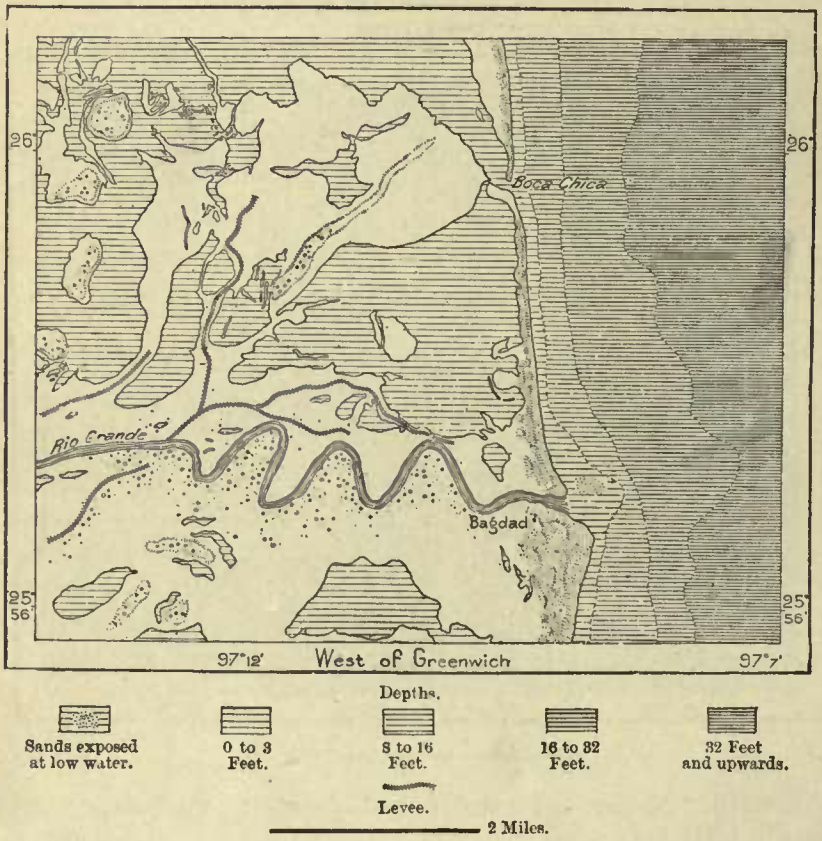
Paso del Norte (3,800 feet) marks the point where the Rio Grande assumes the character of a frontier stream, forming for the rest of its course the boundary between the contiguous Anglo-American and Mexican republics. Below Paso del Norte or El Paso, as it is more usually called, the Grande bends round to the south-east, and here pierces the Sierra Blanca (White Mountain), through a series of narrow cañons excavated in the live rock. It thus reaches a lower level of the plateau, where it is joined by the Rio Conchos, its chief Mexican tributary.

Lower down, the Rio Grande is joined by the Pecos, called also Puerco, or "Pig," from the turbid nature of its muddy saline waters. This affluent descends from the highest plateaux of New Mexico, and flows throughout the whole of

its course in a south-easterly direction, roughly parallel with the Rio Grande. Below the confluence the cañon assumes a still more gloomy and savage aspect, becoming narrower, with steeper limestone walls, which rise in successive layers to a height of 1,000 feet, terminating in fantastic crenellated parapets.

After surmounting the last barriers on its seaward course, the Rio Grande assumes a placid aspect, its tranquil current developing a series of long meanderings on its way to the Gulf of Mexico. But instead of entering the sea directly through a broad estuary, it ramifies into a number of lateral bayous, expands in

Fig. 118.—Mouths of the Rio Grande.
Scale 1 : 200,000.



stagnant lagoons, glides sluggishly between long lines of sandhills, and is then intercepted by a shallow bar inaccessible to vessels drawing over six feet.

The river itself is navigable only for steamers of light draught, and only in its lower course, that is, for a distance of 350 or at most 525 miles from its mouth. Hence in the national economy its value is limited mainly to irrigation; but in this respect its importance is considerable, for there can be no doubt that many now desert regions will be transformed to fertile plains by the waters of the Rio Grande and its Pecos affluent. The superabundant floods of spring help largely to compensate for the scarcity of water in autumn. So enormously is the discharge affected by the seasons that in the cañons the fluvial level may vary as much as a

hundred feet. Even at El Paso the Rio Grande was completely dry for several weeks in the year 1851, though at other times it sends down a volume of many thousand cubic feet per second, flooding its valley with a copious stream.*

III.—Climate, Flora, and Fauna.

A balance between the climate of the Atlantic slope and that of the North American central basin is effected by insensible transitions. The trend of the Appalachian system, which is disposed parallel with the normal course of the winds, facilitates the circulation of the aerial currents, which thus pass without abrupt deviation from one climatic zone to the other.

In the Mississippi valley and along the eastern seaboard the oscillations of temperature present analogous phenomena. Thus in both zones the deflections of the curves of equal temperature for winter and summer differ strikingly from the isothermal lines for the whole year. On both sides of the Alleghanies the summers of the northern regions are warmer and the winters of the southern regions colder than are the same seasons respectively under corresponding isothermals in regions such as France and the British Isles, which enjoy an insular climate. In this respect the central part of the United States presents equilibria even far superior to those of the Atlantic coastlands.†

Towards the sources of the Mississippi, and on the Height of Land in Minnesota and Wisconsin, the summer heats are greater than in the average of tropical regions. Thus at Fort Snelling, near Saint Paul, records are reported of 118° Fahr. in the shade, which is scarcely inferior to that of the Saharan furnace. On the other hand, the cold in these northern regions is often excessive, and far more intense than that of Western Europe under the corresponding isothermals.

According to Henry's researches the discrepancy shown between the real annual temperatures and those yielded by the calculation based on the rotundity of the globe, increases gradually in the direction from south to north. Near the mouth of the Rio Grande under 25° north latitude the true and the calculated line coincide, whereas on the United States frontier towards Canada the abnormal lowering of the mean temperature amounts to over 14 degrees Fahr. At the Mississippi-Missouri confluence, which may be regarded as the meteorological centre at once of the Mississippi basin and of the whole Union, the mean (53° Fahr.) of the annual

* Length of the Rio Grande, 1,800 miles; drainage area, 156,200 square miles; approximate discharge per second, 26,400 cubic feet.

† Mean and extreme temperatures in the central basin of the United States:—

	Lat.	Mean temp.	Summer.	Winter.	Extremes Heat.	Extremes Cold.	Range.
Duluth (12 years) . .	46°48′	40°F.	63°	10°	99°	−38°	137°
Saint Paul (12) . . .	44°53′	44°	67°	9°	100°	−39°	139°
Chicago (12)	41°52′	49°	68°	22°	99°	−13°	112°
Saint Louis (13) . .	38°37′	55°	74°	29°	106°	−17°	123°
Cairo (12)	37°	58°	76°	36°	103°	−7°	110°
Memphis (12) . . .	35°8′	61°	78°	42°	98°	+2°	96°
Vicksburg (12) . . .	32°24′	65°	81°	50°	101°	+10°	91°
New Orleans (12) . .	29°57′	69°	82°	58°	96°	+15°	81°

temperatures oscillates between 20 and 23 degrees; here the range between the two extremes of heat and cold reaches 126 degrees in ordinary years.

These extremes, which would be trying enough if produced regularly by a gradual movement from winter to summer and from summer to winter, are all the more severely felt that the changes of temperature are at times almost abrupt. According to Loomis variations of 45 degrees have been recorded in a single day. At Denver, which is commanded on the west by the chain of the Rocky Mountains, the mercury fell in a single hour 52 degrees on January 5th, 1875, and the fall would appear to have been as much as 36 degrees in five minutes while a fierce storm was raging some distance to the east.

These sudden transitions from one extreme to the other, producing as it were a shifting of the northern climate to the south, or of the southern to the north, are caused by the displacement of the aërial "waves" in the atmospheric ocean. Hence the expressions *hot waves* and *cold waves* are usually applied by the Americans to the complexity of the meteorological phenomena associated with all such abrupt transitions often successively experienced over wide expanses. In January, 1886, a cold wave, accompanied by northern winds which here and there assumed the character of a gale, swept over all the Central States as far as the Gulf of Mexico, and all the southern cities situated in a region actually bordering on the tropics found their temperature suddenly lowered to below freezing point. At New Orleans the mercury stood at 15° Fahr., at Mobile it indicated 11°, and the same at Galveston, where in eighteen hours the atmosphere cooled down 54 degrees.

It is commonly assumed that the severe winters of the United States correspond to mild seasons in West Europe, and hot to moderately warm summers respectively. But this view is not always justified. Such compensating of the balance between the climates of the two hemispheres has certainly been often observed; but on the other hand a remarkable coincidence in the oscillations of the thermometer has also been occasionally recorded on both sides of the Atlantic.

In the central basin of the United States a special climatic zone is formed by the region of the Great Lakes, which are vast enough to exercise a moderating influence on the surrounding lands, and thus to some extent diminish the range between the two extremes. In summer the temperature is lowered, and in winter correspondingly raised several degrees along their east margin. The great volume of water, where the oscillations between heat and cold can only take place very slowly, gradually influences the whole of the circumambient atmosphere for a distance of some hundred miles. Nevertheless, Lake Michigan froze in the winter of 1871-72, and although this is of very rare occurrence, the Sault Sainte-Marie Canal between Lakes Superior and Huron is regularly closed by ice for about 130 days every winter.

The remarkable contrast between the summer and winter isothermals shows in a striking manner how greatly the normal climate is modified by the vast freshwater basins of these inland seas. In January the strata of low temperature are regularly intercepted round about the shores of Lake Superior, while two isolated zones of cold occupy the centre of the Michigan peninsula and the plains

of Iowa between the Mississippi and the Missouri. In summer the reverse takes place, and these cold zones of Michigan and Iowa are replaced by zones of sultry heat, while the isothermals are deflected southwards on both sides of Lake Michigan in such a way as to describe in the air lines corresponding to the contours of this lacustrine basin. The isothermal of 68° Fahr., which in July passes over the southern shores of Lake Superior, is deflected about five degrees of latitude, or some 350 miles, by the presence of the Michigan reservoir; as a rule the summer temperature is the same all round the west side of the lake from Milwaukee to the entrance of Green Bay.

As on the Atlantic seaboard, the rainfall is heavier in the Southern States, in direct proportion to the mean temperature. Thus it decreases from 50 inches at New Orleans and 60 at Baton Rouge to 39 at Saint Louis and 28 at Milwaukee. But in the direction from east to west the decrease is even more rapid than from south to north. Between New Orleans and Lake Erie throughout the whole zone from the Appalachians to the Mississippi, the mean annual rainfall, which ranges from about 51 to 28 inches, may be estimated at 40 inches; but in the corresponding zone which skirts the base of the Rocky Mountains from Texas to Dakota the average is not much more than 15 inches.

The most copious rains occur at the beginning of summer, from May to June, throughout nearly the whole of the Mississippi region, except towards the confluence of the Red River with the main stream; but even here June is also a rainy month, although the great downpours take place in December; rain, however, falls in every month of the year. The longest periods of drought have been recorded in January and February.

In exceptionally wet seasons the rain gauge has often measured over 4 inches at a time, and in 1889 the liquid column rose in the valley of the Conemaugh, which flows through the Alleghany and Ohio to the Mississippi, as high as 6·3 inches; it was on this occasion that the city of Johnstown was swept away by a deluge of water. A far heavier downpour has been recorded at Alexandria, a city on the banks of the Red River in Louisiana, where the rainfall amounted to 22 inches in a single day; this is the heaviest quantity reported in the meteorological annals of North America.

The abundance of the precipitation is by no means in direct ratio to the number of rainy days. On the contrary, Louisiana, the wettest region in the Mississippi basin, has on an average not more than 92 wet days, whereas the drier states of the upper Mississippi and of the Great Lake region have about 100, rising at Buffalo to 169, and to 177 at Erie.

Nor can the actual downpour be gauged by the proportion of atmospheric humidity. Thus the atmosphere in the States of Michigan and Wisconsin is as a rule charged with far more aqueous vapour than that of the Central States; but this vapour less frequently reaches the point of saturation.

No part of the Mississippi region is entirely free from snow; a few flakes have fallen even at New Orleans, and at Galveston on the coast of Texas. But here it melts at once, whereas in the northern parts of the basin it remains for months

on the ground to a depth of two or more feet. At the same time rivers and lakes are bound in hard fetters of ice; in 1852 the deputies from the district of Pembina in Minnesota travelled to Saint Paul, the state capital, in sleighs drawn by dogs. The abrupt changes of temperature cause the phenomenon of sleet or freezing rain to recur with a frequence and intensity seldom witnessed in Europe. Trees have often given way under the burden of sparkling prisms, assuming the loveliest forms, their branches and foliage encased in heavy crystal bonds.

Evaporation, especially on the treeless Western prairies, is greatly stimulated by the extremes of temperature so characteristic of the American climate. Such is the dryness of the atmosphere in these regions that the traveller rarely perspires even in the full glare of the sun. Rain falls quite suddenly without being preceded by any gradual accumulation of aërial vapours, and the shower is scarcely over when the atmosphere resumes its relative purity. Fog, mist, and dew are almost unknown phenomena. The prairie grasses wither and dry up without losing any of their nutritive qualities, which is not by any means the case in the Eastern States; meat also, when sliced and exposed to the air, very seldom becomes putrid, even in rainy weather. According to one somewhat widely accepted hypothesis this dryness of the air is the chief cause of that tendency to leanness, combined with a dry and nervous temperament, by which the Americans are distinguished from their European progenitors. As in Europe, meteorologists have recorded certain oscillations in the climate, cycles marked by an increase or a decrease of atmospheric humidity. From 1886 to 1891 a deficiency of moisture was generally felt, and the Great Lakes, acting like a huge udometer, gauged the extent of the desiccation by subsiding nearly 40 inches below the normal level.*

In the Mississippi, as in the Appalachian region, westerly winds predominate. The general atmospheric movement sets in the opposite direction to the trade winds, from the North American continent towards West Europe, only the great central depression, being disposed from north to south, has the consequence of deflecting the aërial currents in the same direction. Moreover, the presence of a Mediterranean (Caribbean Sea and Gulf of Mexico), south of this section of the continent, has determined a certain alternation of monsoons and currents along the main axis of the same central depression. In Louisiana and Texas the Gulf monsoons prevail on the coast normally during the summer months with a mean velocity of from 20 to 25 miles an hour. In winter the northern gales, the much-talked-of *nortes* of the Mexican seaboard, descend with violence from the Texan plateaux; these counter-monsoons doubtless owe something of their fury to the polar current, which sets from the Frozen Ocean without meeting along its route any heights sufficiently elevated to deflect them from their southerly course.

In the United States most of the atmospheric disturbances partake of the

* Mean annual rainfall in the central regions of the United States :—

	inches.
Shores of the Great Lakes, Cleveland	31
Ohio Valley, Cincinnati	38
Upper Mississippi, Dubuque	40
Mouth of the Missouri above Saint Louis	39
Mississippi Delta, New Orleans	50

nature of cyclones, without, however, presenting the same regularity in their spiral movement as those gyrating over the high seas. Storms, properly so called, often sweep the surface of the plains, especially in the northern parts of the Union. They begin in the Far West and follow an easterly course, developing a graceful curve with its convex side facing southwards. Frequently they traverse the States of Dakota and Minnesota, Lakes Superior and Huron, continuing their seaward march down the Saint Lawrence valley at a mean velocity of 40,000 yards or 25 miles an hour, as calculated by Loomis for the fifteen years from 1870 to 1884. But in winter, and especially in February, the storm often moves at a much more rapid rate, at times rushing along at a speed of nearly 45 miles an hour. Even in August, when the displacement is much slower, it exceeds the velocity of European gales. In winter the storms most dreaded in the north are the formidable "blizzards," that freeze the traveller in a moment and often bury him in a whirlwind of snow.

Very many cyclonic storms take their rise in the south-west, south or south-east, instead of in the far north-west, and describe an arc of a circle north-eastwardly across the central plains on their career over the Appalachians to the coast. They do not, however, always follow the same regular course, but quite generally pass over the "lower lake" region (Erie and Ontario) into the Saint Lawrence valley.

Tornadoes are a common and peculiar phenomena in the Mississippi valley, especially in Illinois, Kansas, Missouri and Iowa, where they occur most frequently. They consist of a relatively small whirlwind of excessive violence, and are generally developed in the south-eastern quarter of some large but moderate cyclonic storm. They take place especially in the months of April, May, June and July, though they have occurred in every month, but almost always in the afternoon. They are usually accompanied by rain, and are first seen in the south-west as a funnel-shaped cloud of intense blackness depending from a dark and ghastly sky. The small end of the funnel often appears to touch the earth, along the surface of which it seems to bound from place to place as the awful whirlwind sweeps onward in its course towards the north-east.

The onward movement of the tornado varies from 15 to 70 miles an hour; but the velocity of the whirling air on the periphery of the central funnel often exceeds that rate ten times, the air sweeping round at a speed of over 620 miles an hour. Nothing can resist such a force. Trees are uprooted, twisted and blown about like chaff, houses fly to pieces in the air, locomotives are hurled from the rails to the neighbouring fields, rivulets are left dry by suction, and a lagoon two acres in extent, near Jamestown in Dakota, was thus suddenly evaporated and reclaimed for tillage.

The track of these destructive whirlwinds, fortunately seldom more than 1,000 feet wide, but sometimes 10 to 30 miles long, is indicated by the broken branches, fragments of beams and rafters, and the *débris* of everything which opposed the terrific energy of the tornado. After many years the traveller may still recognise in the forests of Kentucky the path cleared by an ancient whirlwind,

and quite recently another of these terrific storms swept away many houses and destroyed hundreds of lives.

The frequency of these disasters gives a practical importance of quite exceptional character to the study of American meteorology; at the same time the researches of observers have been facilitated by the vast extent of the plains, the simplicity of the general relief, and the regularity in their order of sequence presented by certain climatic phenomena. In no other region of the globe have weather forecastings been more successfully studied. According to the official tables, the storm warnings announced a day in advance are justified eighty-four times in a hundred. Those transmitted by cable from America to Europe are of less value, for the blizzards and cyclones advancing from the Western prairies to the Atlantic coasts become lost or dispersed in the sea, and especially in the Nova Scotia and Newfoundland waters. Nevertheless, the warnings received from New York have often enabled skippers to avoid shipwreck in the European seas.

Flora and Fauna of the Mississippi Basin.

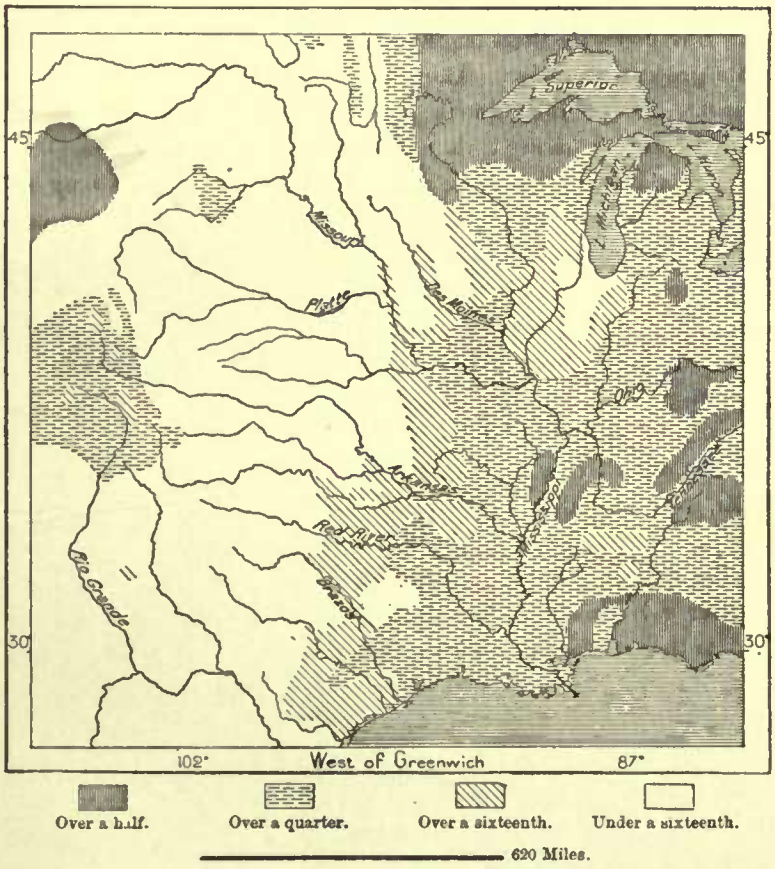
At the arrival of the white man, the vast space stretching from the Appalachians to the prairies of the Illinois valley and to the great plains beyond the Mississippi, was, like the Atlantic slope, still an ocean of verdure dotted over with a few isolated clearings. The woodlands, whose superficial extent was at least equal to that of France, Spain and Italy taken together, and which were continued beyond the Saint Lawrence far into Canada, were composed almost exclusively of deciduous trees, such as oaks, beeches, and maples, the ash, elm and lime, walnuts and chestnuts, the cherry, poplar and magnolia, all following each other in a certain natural rotation. Both north and south these diversified woodlands were limited by a zone of uniform vegetation, in which the conifers predominated. On the one hand were the white pines of the Lake Superior region, on the other the "balsam" pines (*Pinus balsamifera*) of the southern Appalachians, and towards the Gulf of Mexico the yellow pines (*Pinus palustris*) and the so-called "cypress" (*Cupressus disticha*). On the east side an analogous contrast was produced by the conifers, which here also prevailed. Thus the main axis of the Alleghanies formed the parting-line between the several botanic zones.

But this forest zone of the Mississippi regions did not reach westwards as far as the Rocky Mountains. Even in the cis-Mississippi districts vast expanses were destitute of trees, and Illinois has received the distinctive title of the "Prairie State," from the prairies,* or seas of natural grasses diversified with yew thickets, occupying the interfluvial spaces, while the rivers themselves were everywhere fringed by continuous belts of arborescent growths. In the State of Indiana also occur immense grassy spaces, where the ground has preserved no traces of any former forest that may have once existed there. When these regions were first traversed by the aboriginal hunting tribes they were as destitute of trees as at

* This is simply the French word *prairie*, a meadow, from the Latin *pratum* through the debased form *prataria*. It was applied in a general way by the early Canadian settlers to the boundless expanses of level or rolling treeless lands carpeted with coarse tall grasses, and interspersed with many varieties of herbaceous and other flowering plants.—Ed.

present. This dearth of timber cannot be attributed to fires, for fresh saplings spring up in the ashes after the passage of the devouring element. In several places the predominance of grasses may be explained by special causes. Thus around the margins of old dried-up lakes the peaty nature of the soil harbours acids injurious to the growth of woody tissues, and is consequently more favourable to a herbaceous vegetation. Elsewhere the dust derived from disintegrated rocks produces a sort of fine paste, through which the roots of trees have a difficulty in penetrating. But the great predominance of prairie grasses is most

Fig. 119.—Range of Forests in the Central Region.
Scale 1 : 25,000,000.



probably determined by the climate. The eastern limit of these plains under a herbaceous vegetation coincides with that of the regions where the mean annual rainfall is about 40 inches. Doubtless the humidity of the atmosphere and of the ground west of this well-watered zone might still abundantly suffice, as in many other countries, for the growth of continuous woodlands with large forest trees, and wherever the work of man is available, orchards, groves and parks have been developed. But left to itself, nature adapts itself more readily to the growth of herbaceous plants, which spring up and spread almost everywhere spontaneously. Here they find a more favourable environment, whereas the

seedlings of large growths are choked by the thousands of rootlets which sprout suddenly in spring, and are killed by the winter frosts. Nevertheless, in certain districts, notably in the Green River basin, Kentucky, the woodlands have encroached upon the whole prairie domain. The grassy plains of the Missouri in the neighbourhood of Saint Louis are now also covered with timber that has sprung up spontaneously.

Scarcely any of the prairies are now found in their primitive condition. Thanks to the development of agriculture the boundless plains have been to a great extent cut up into farmsteads, bounded by roadways and enclosed by fences. Nowhere can the traveller now contemplate those seas of waving grasses, which stretched beyond the horizon over a rolling surface, like an endless succession of billows. But here and there certain isolated tracts have been preserved, set apart for the growth of fodder. The prairie usually presents a somewhat monotonous aspect. Asters, leguminous plants, cereals, intermingle their forms in about equal proportion, though they vary in size and fulness with the greater or less fertility and moisture of the soil. In the bottom-lands they shoot up to such a height that a man on horseback disappears entirely in the midst of the tall grasses. In spring the prevailing colour of the flowers is red, which is followed by blue in summer and yellow in autumn. Under the influence of a stiff breeze, the foliage of the leguminous varieties is raised, revealing a whitish under side, clothed with velvety hairs, then the verdant mass is seen to heave and die away in long silver crested waves.

In certain rocky districts of the north the woodlands have perished by conflagrations caused either by lightning or the hand of man. The granitic plains of Michigan, Wisconsin and Minnesota, whose surface has been levelled and polished by glaciation, prevent the woody rootlets from penetrating downwards, except in the narrow rifts of the ground. Hence the trunks, being unable to resist the fierce gales, are uprooted and strewn in disorder over the surface. In many districts the wayfarer meets barricades of trees thus piled up and covering considerable spaces. Some were observed near Fort Snelling which stretched for a distance of 60 miles, with a breadth varying from 10 to 12 miles. To get rid of these insurmountable obstacles, the hunters set them on fire, and then the vast pile becomes wrapped in sheets of flame, the fierce heat of which chars the underlying rock itself. Thus the site of former fires is still revealed from a distance by the patches of bare rocky soil.

West of the Mississippi the stretches of woodlands beyond the prairies lack the dense undergrowths that are seen in the forests of Virginia and Kentucky. The species are the same, but the general aspect differs. Enjoying less abundance of moisture, the trees no longer shoot out such luxuriant and leafy branches; they no longer riot in the same wealth of form and irregular outline; the underwood tends to disappear; the creepers coiling from bough to bough grow less frequent. Patches of greensward encircle the stems, and the landscape gradually becomes more open and park-like. Farther on, in the neighbourhood of the western steppes, the trees themselves have no longer the normal proportions,

and perish prematurely. The irregular parting-line between the forest and herbaceous zones, which is indented with inlets or projects in headlands according to the contrasts of soil and climate, is itself displaced from decade to decade, now encroaching on the prairies, now retreating before them. After a year of persistent drought, the traveller may at times wander along the verge of the plain through a forest which is still standing, but which is now leafless

Fig. 120.—Mississippi Scenery; View taken at Fort Snelling.

and dead, killed by the lack of moisture; presently it is attacked by the insect world; it crumbles to dust, and the space occupied by it merges in the domain of herbaceous vegetation.

The oscillations of climate revealed in the spontaneous flora of the plains between the Arkansas and upper Missouri, also diversely affect the agricultural interests of the country. During the prevalence of abundant rains the climate is one of the best for tillage, and the population increases; but a succession of dry years is inevitably followed by bad harvests and a displacement of the farming element.

Thanks to the extension of the range of moisture throughout the region comprised between the Arkansas and the Rio Brazos, south of Indian Territory, a forest zone from 6 to 30 miles broad and rather over 370 miles long has been developed obliquely in the direction from north-east to south-west. This tract bears the name of the *Cross Timbers*, and is formed of various species of small-leafed oaks, which grow in an arid soil, not continuously but interrupted by extensive spaces of open or sparsely planted sward. Before these woods were attacked by the axe, and before they were cut up by roads, or even railways, they were already sufficiently accessible to allow of the passage of cattle; carts could even traverse the region in all directions, whence the name of "cross" given to it by the first explorers. The Cross Timbers form the natural frontier between the fertile eastern lands, suitable for tillage and settlement, and the drier western plateaux, which is better suited for pasturage than for agriculture. Formerly this wooded zone indicated the parting-line between the settled and nomad aborigines. Not a single forest, not a single wood is met in the whole region between the Cross Timbers and the wooded slopes of the Rocky Mountains, a distance of some 500 miles. This lack of arborescent vegetation is due more to the porous nature of the soil than to the dryness of the atmosphere and the deficient rainfall. All the water precipitated on these plateaux immediately disappears in the fissures of the rocks, and winds its way to the rivers along the bed of cañons.

In the Southern states bordering on the Gulf of Mexico the land is distributed between three distinct forest zones. Along the less fertile tracts skirting the left bank of the Mississippi and stretching east as far as Alabama, pines grow in dense masses, and are regarded by the inhabitants as a protecting screen against the malarious exhalations of the morasses. During the years when marsh fevers prevail the people of New Orleans and Mobile take refuge in thousands in the health resorts established in the shade of these conifers. In spring the pollen, wafted on the breeze, is carried hundreds of miles, filling the whole atmosphere with a characteristic fragrance. Even beyond the Mississippi it covers the ground, the swamps, and the very streams with long streaks, at a distance resembling trails of sawdust.

West of the *Pine Barrens*, as these tracts are called, the often-flooded plains bordering on the Mississippi and its bayous form vast cypress groves like those of the watery lowlands in South Carolina and Georgia. Then, still farther west, the woodlands alternate with savannas on the comparatively more elevated grounds.

These charming forest regions resemble those of Europe in their sunny glades, their shady winding tracks; but they surpass them in the splendour of their foliage and the picturesque disorder of their clumps of trees. As the wayfarer saunters along these leafy avenues, the landscape varies incessantly; every fresh outlet presents a new prospect to the gaze. The oaks and maples, the ash, magnolia, copal, willow, and Virginia poplar are grouped in distinct clusters in accordance with their varying laws of association.

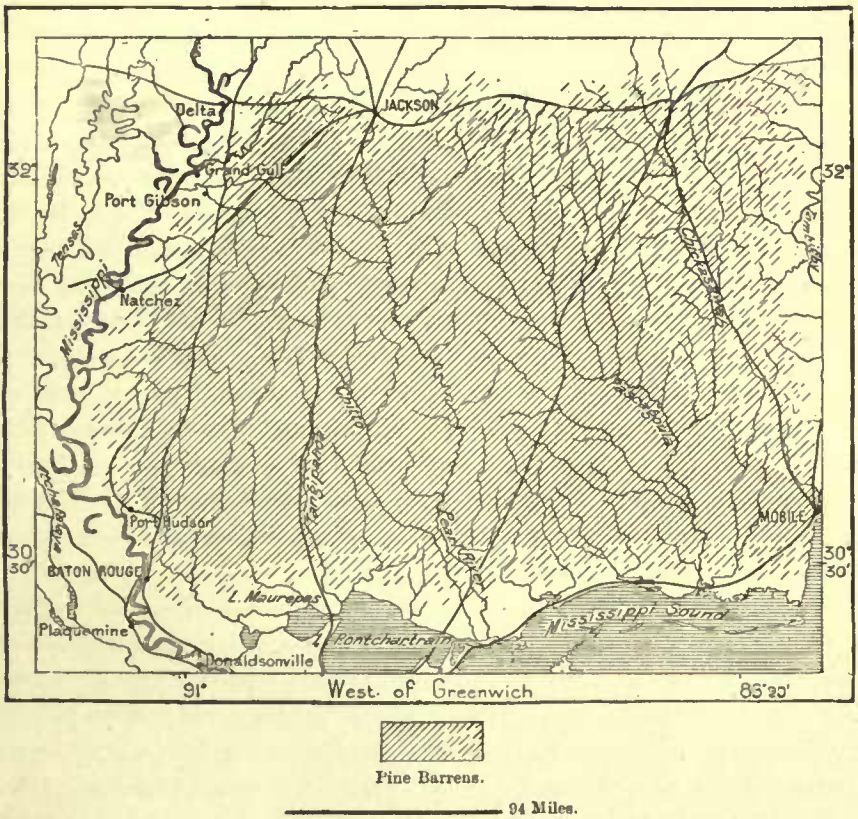
The latania palm spreads its broad fan-shaped leaves round the stem, while the

huge coils of the soco or wild grape wave to and fro between the trees like the cordage between the masts of a ship; but they nowhere form any inextricable tangle of ropework, like those of tropical America. Everywhere the traveller moves about freely, except where the acacias intertwine their branches armed with treble knots of thorns, or in the wild cane brakes, where only the snake can glide.

West of the zone of Mississippi woodlands there follows a region of steppes completely separating them from the Rocky Mountains. But these stunted prairies, being less copiously watered, differ in aspect from those of the Illinois region east of the Mississippi. They nowhere present the appearance of a

Fig. 121.—Pine Barrens of the Mississippi Basin.

Scale 1 : 5,500 000.



continuous sea of waving grasses, but the herbaceous plants grow in separate tufts, and assume a grey tint. In the zone immediately beyond the forests the dominant family is that of the asters; but here also occurs the compass plant (*Silphium laciniatum*), a kind of rudimentary compass, which presents the edge of its leaves, north and south, in the direction of the magnetic meridian, while their faces are turned east and west. It thus serves in cloudy weather or dark nights to guide travellers, who by feeling the edges of the leaves are able to find their bearings. But in the vast expanse which rises gradually towards the Rocky Mountains, the plant which imparts to the land its characteristic physiognomy is

a species of wormwood (*Artemisia tridentata*); it occurs on the banks of the lower Kansas, but becomes more and more common in the direction of the west, and especially in tracts covered by saline efflorescences. For days together the traveller traverses the boundless spaces overgrown with this plant, breathing an atmosphere heavily laden with its peculiar odour of camphor and turpentine.

Lastly, the gramma or "bison grass" forms a natural pasturage in the vast spaces along the eastern foot of the Rockies. Thanks to the dryness of the atmosphere the hay left standing is preserved into the heart of winter, yielding sufficient fodder for cattle. Farther north, in the Dakotas, one of the chief resources of the natives is the "white apple" (*Psoralea esculenta*); in the districts where game has become scarce the Indians depend almost entirely on this tuber during the winter months. The "ground nut" (*Apios tuberosa*), which is dug up in large quantities in all bottom-lands, also supplies a much-relished aliment to the natives. The little rodents of these regions store it in considerable quantities in their underground galleries, and towards the beginning of winter the native women go in quest of these stores, which they plunder for their own benefit.

With respect to economic plants the climate of the United States, with its great range of temperature, its great heat and heavy summer rains, may be said to enjoy special advantages. The species which flourish in the neighbourhood of the tropics are attracted northwards by the exceptional summer heat, and they are thus propagated in regions where the mean temperature for the whole year is much lower than in other countries where they cannot thrive. This is especially one of the characteristic features of the Mississippi valley. Here the sugar-cane, cotton, maize, and other plants, which do not occur in the corresponding isothermal zones of Europe, yield abundant crops. The large cotton plantations of the United States are intersected by the isothermal line that passes through Lisbon, Marseilles, and Florence. These plantations extend at some points even as far north as the isothermals of London and Paris.

The region of the western steppes, from Texas to the Canadian frontier and from the zone of tillage to the foot of the Rocky Mountains, has its special fauna, represented chiefly by species that burrow in the sandy soil or hide in the cavities of the rocks. Even the "wolf" or coyote, which, however, resembles a jackal more than a European wolf, has acquired the same burrowing habits. Amongst the numerous species of rodents the best known is the "prairie dog" (*Cynomys ludovicianus*), a species of squirrel which is associated in the popular fancy with much legendary matter. It lives on herbs, grasshoppers, and other insects, and bears no resemblance to any variety of dog except in its bushy tail, and in its cry, which is like that of a yelping puppy; hence it is locally called the *barking squirrel*. Both natives and settlers are unanimous in asserting that the rattlesnake, the little burrowing owl, tortoises, frogs, tarantulas, and even hares, all form a "happy family," dwelling together in the warrens of the prairie dog. Many travellers, Bartlett amongst others, assert that they have witnessed this cohabitation with their own eyes. The little hillocks surmounting these underground galleries range in height from 3 to 6 or 7 feet, and have an average circumference of 30

feet; a beaten track connects all the mounds with each other, which is itself a proof of the sociable character of the little inmates. Their "towns" in some places cover extensive plains stretching beyond the horizon. They sometimes even cross the river beds, and many watercourses are lined on both sides by the hillocks. On Brady's Creek in the upper valley of the East Colorado, Bartlett and his companions took three days to traverse one of these cities, where mound followed mound without interruption for a distance of 60 miles. Assuming that this interminable settlement had a width of not more than 10 miles, and that each family of four individuals occupied a space of about 1,000 square feet, the Brady's Creek community must have comprised some 60,000,000 prairie dogs.

But while the smaller organisms, secure in their underground dwellings, resist the invasion of man, the large game is everywhere disappearing. At the beginning of the eighteenth century the bison still peopled over a third of the North American continent. He roamed over the whole region of the Rocky Mountains from the shores of the Great Slave Lake and the Mackenzie River to the Mexican province of Chihuahua. Eastwards also he crossed the Mississippi, penetrating into the prairies of the Illinois basin. He was hunted throughout the whole of the Ohio valley; but he nowhere reached the basin of the Great Lakes nor the banks of the Saint Lawrence. Nor does he appear to have ever advanced southwards much beyond the Tennessee valley, while on the eastern slopes of the Alleghanies his remains are found only in the elevated regions of both Carolinas. Thus the bison was essentially a continental quadruped; no hunter ever met him either on the Atlantic seaboard, or in the vicinity of the Pacific Ocean. The statements made by the early explorers regarding the prodigious numbers of this mammal are by no means exaggerated. We know for certain that the great herds grazing on the Western steppes and prairies sometimes took weeks together to traverse a given district. Multitudes followed multitudes like the successive waves of minute organisms by which whole tracts are blighted.

Even so recently as the beginning of 1871, that is, at a time when the work of extermination had already made great progress, the chief herd that roamed the upper Arkansas basin occupied a space estimated at 50 miles by 25, and here the average density varied from 15 to 20 head per acre. Hence this single herd must have contained some millions of individuals. Even after the commencement of the transcontinental railways, enormous hordes were still met along the main tracks. On the *Kansas Pacific* trains were thrown off the rails while endeavouring to force a passage through a herd of bisons.

The Indians, who lived on the flesh of these animals, were careful not to massacre them recklessly; for them the preservation of the herds, on which their own existence depended, was regarded as a sacred duty. But the whites harboured no such scruples regarding the great beast. They slew him for his hide alone, or even for his tongue, and if they condescended to eat the flesh they confined themselves to that of the cow, which was reputed to be more delicate. Like the fox in the poultry yard, they killed and killed through mere thirst of blood. Certain ignoble methods

of hunting were sheer butcheries. Thus they closed round a troop, each member of which, being forced to escape through a narrow rocky or fenced gullet, perished inevitably.

At the beginning of the nineteenth century bisons were still met in the Ohio

Fig. 122.—Gradual Disappearance of the Bison.

Scale 1 : 35,000,000.

valley, but in the year 1830 the last of the survivors this side the Mississippi were slaughtered, and towards the middle of the century scarcely any were met beyond the steppe region of the Far West along the foot of the Rocky Mountains.

Then came the railways, penetrating into the grazing grounds and dividing the great herds into separate groups. In 1869 the completion of the first transcontinental line finally cut the range of the bison into two isolated domains, and since then the borders of these enclaves have been rapidly contracted. According to Hornaday, on January 1st, 1889, not more than three hundred wild bisons still survived in the whole territory of the Union, and of this number two-thirds were confined to the Yellowstone National Park. But a new era has begun, and the period of extermination has been succeeded by stockbreeding. A few hundred tame bisons are already found on the ranches, and new varieties have been produced by crossings with cattle of European origin.

In the Southern States another large animal, the alligator, is also threatened with extinction. For many years alligators have ceased to frequent the Mississippi, whence they have been driven by the steamers to the lateral bayous. The increasing value of its hide, of its teeth, and of the oil extracted from its flesh has attracted the attention of hunters more and more to this saurian.

The former balance of animal life, as maintained by natural processes, has in recent times been modified in a thousand ways by the foundation of towns, by the settlement of the land, and the destruction of the great forests. When the pioneers first crossed the Alleghanies and penetrated into the Ohio valley, certain species of birds existed in prodigious multitudes. When they took wing their countless myriads darkened the heavens, and they fell like hail to the ground. Some idea of the effect when they alighted may still be had from the flocks of martins in Louisiana, where they swarm like midges in a marsh, crossing the Mississippi in the morning to their feeding-grounds in the pine forests on the left bank, and returning in the evening to the right bank. Formerly the exodus of pigeons lasted days together, during which the rustle of their wings never ceased, the air was charged with their odour, and when they alighted on the trees, the branches crashed beneath their weight; birds of prey followed in their wake, and those that fell were either devoured by bears, wolves, foxes, and other carnivorous beasts, or served to fatten the pigs of the farmsteads.

The scourge of mosquitoes and gnats is nowhere more dreaded than in certain parts of Minnesota and Dakota on the banks of the lakes and streams. Cattle and horses left without shelter during the summer nights are said to have perished from the bites of these winged pests, and the Sioux Indians have put their captives to death by exposing them naked to the exquisite torture of a night passed in the open air on some spot infested by these midges. In the marshlands of lower Louisiana the mosquitoes are quite as bloodthirsty as in the northern swamps. On certain plantations south of New Orleans, the people are fain to pass their days under gauze, or to coat the body with clay, for all life is a continued martyrdom. Some exceedingly fertile tracts have had to be abandoned, tillage being rendered impossible by the dense clouds of midges filling the atmosphere.

CHAPTER VI.

STATES AND TOWNS OF THE MISSISSIPPI BASIN.

1.—West Virginia.

WEST Virginia is a state of recent origin, having been organised during the Civil War. Its inhabitants, objecting to be drawn with East Virginia into the Confederacy, seceded from the "Old Dominion," and grouped themselves in a new state, which, after two years of legal discussion, was admitted into the Union as one of the sovereign commonwealths.

In a general way West Virginia may be regarded as a trans-Alleghany region; nevertheless, its frontiers do not coincide with the natural divisions of the land, and the right bank of the Potomac forms its limits as far as the confluence of the Shenandoah on the Atlantic slope. Towards the north it also possesses a narrow strip of territory lying between the left bank of the Ohio and the west frontier of Pennsylvania; this is the district somewhat fancifully called the *Pan Handle*.

Comprised almost entirely within the upper Ohio basin, West Virginia is mountainous, or at least hilly and broken, throughout its entire extent. Towards the east it includes the parallel Appalachian ridges, and on the west the chains of hills between which wind the Monongahela, the Great and Little Kanawha. Like the conterminous states of Ohio and Pennsylvania, West Virginia is an agricultural and mining region. Its deposits of coal, iron, and salt give it a manufacturing importance, which cannot but increase from year to year, and which tends to constitute it an industrial extension of Pennsylvania. Lying somewhat apart from the great natural highways of communication, except as regards the Ohio valley, which forms the north-western frontier, the whole region has remained somewhat secluded, and even still foreign settlers form but a small proportion of the population.

On the Atlantic slope the most important town is *Martinsburg*, which lies on a fertile undulating plateau draining northwards in the direction of the Potomac. But the most famous place in the district is the half-ruined borough of *Harpers Ferry*, which occupies the steep slope of a hill between the Potomac and Shenandoah, which here converge at a sharp angle. At the confluence the main

stream is crossed by a bridge, while the left bank is skirted by a canal, which conveys to Washington the produce of the upper valleys.

Harpers Ferry is an important strategic point, which commands towards the east the first passes over the Alleghanies. Here the Union possessed an arsenal, which the notorious John Brown attempted to seize for the purpose of making it the bulwark of the negro insurrection which he was fomenting. But his little band of twenty men was speedily overwhelmed and annihilated by the militia of the planters hastening in hundreds and thousands to the rescue. Brown himself, having been severely wounded, was executed in the neighbouring borough of *Charlestown* on December 2nd, 1859.

Harpers Ferry was also the scene of an important event during the Civil War, when the Southern commander, Stonewall Jackson, attacked the Federal army under General Miles, and after a brief cannonade captured nearly 12,000 men on September 15th, 1862.

In accordance with the usual custom, West Virginia has chosen for its capital a place situated in the centre of the state. Such is *Charlestown*, on the Kanawha, which possesses no industrial importance beyond that of its salt and coal mines, and which lies in such an inaccessible district, that it was long abandoned by the State legislators. They made choice of *Wheeling*, which, although situated in a remote district, enjoyed the great advantage of standing both on the banks of the Ohio and on the main line of railway between Pittsburg and Cincinnati.

The towns that here skirt the banks of the Ohio form a long line of industrial centres, which are crowded together especially round about *Parkersburg* and *Huntington*. A bridge about one and a half miles long crosses the Ohio opposite Parkersburg, at the mouth of the Little Kanawha, some 95 miles below Wheeling. Huntington, which lies just below the mouth of the Guyandotte River, 20 miles above Ironton, is the site of Marshall College, and of a state normal school.

2.—Ohio.

The State of Ohio, so named from the river which borders it on the south-east and south, where it is conterminous with West Virginia and Kentucky, is bounded on the north by Lake Erie; elsewhere its frontiers, eastward in the direction of Pennsylvania, west and north-west towards Indiana and Michigan, are formed by conventional geometrical lines.

Ohio was not one of the original thirteen states; in fact, the colonisation of the country had not begun at the time of the War of Independence, although its possession had already been disputed by the English and French. Marietta, the first American town in the present territory of the state, dates only from the year 1788, and the state itself was not constituted till the year 1803.

For some years after the arrival of the first settlers, colonisation was retarded by the Indian wars; but towards the close of the eighteenth century considerable progress had been made, and when the great tide of European emigration began to flow the chief stream of agricultural colonists set in the direction of Ohio. Its well-watered and gently undulating lands are everywhere fertile, and

throughout their whole extent scarcely present any obstructions to farming operations. Hence, this region from Lake Erie to the Ohio has become a continuous succession of cornfields, meadows, groves and orchards. The culminating-point of the state between the head-waters of the Scioto and Miami Rivers in Logan County attains a height of not more than 1,540 feet.

Round all the towns the manufacturing industries, fed by coalfields covering a superficial area of 10,000 square miles in the east and south-east, with a yearly output valued at $10,000,000, are represented by a large number of factories, while the inland navigation has acquired a great development, thanks especially to the navigable canals, by which the Ohio communicates with the basin of the Great Lakes.

In the space of a hundred years the population of the state has grown to over 3,000,000, and in this respect Ohio is outstripped only by New York, Pennsylvania and Illinois. The first immigrants were for the most part New Englanders of the old Puritan stock; then followed settlers of foreign origin, especially Germans, who flocked in large numbers to the towns. The "Buckeye State," as it is called, takes its name from the *buckeye*, or American horse-chesnut (*Æsculus glabra*), which is characteristic of the Ohio woodlands.

In Ohio the chief place in the lacustrine district, and one of the most populous amongst the secondary towns of the United States, takes the name of *Cleveland*, from General Moses Cleaveland, by whom it was laid out in the year 1796, though not incorporated as a city till 1836. It stands on an old terraced beach of Lake Erie, whence a view is commanded of the roadstead and of the mouth of the little Cuyahoga, or "Winding River," which meanders through the town, and forms a well-sheltered harbour on the lake. The broad straight thoroughfares are nearly all planted with shady maples, whence Cleveland has acquired the name of the "Forest City." Euclid Avenue, one of these boulevards, has the reputation of being the finest urban promenade in the United States, the "Champs-Elysées of America;" but it is flanked by far larger hotels, more delightful pleasure-grounds, greener and more velvety swards than those of Paris.

In 1840 Cleveland was still a small place of not more than 6,000 inhabitants. But it began to expand suddenly towards the middle of the century, and is now one of the "Queens of the West," surpassed in the lake region only by Chicago. Its industries, fed by the neighbouring coalfields, have acquired a great development, and the local capitalists have almost a monopoly of the petroleum trade; the chief oil basins are connected with the city by iron conduits, or "pipe lines."

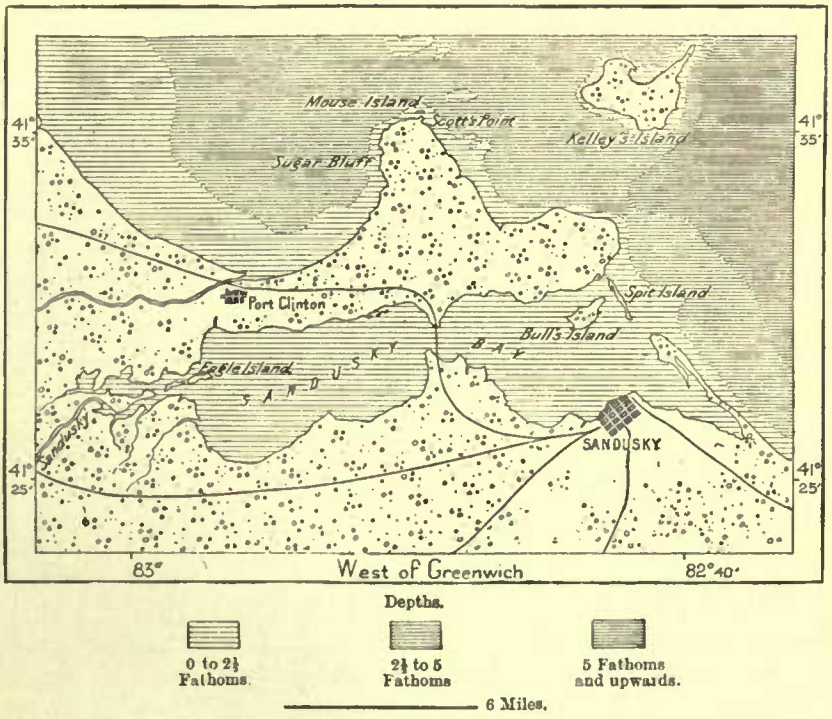
Cleveland rivals Chicago and Buffalo themselves in the extent of its traffic on the Great Lakes. Its port of Cuyahoga is the converging-point of numerous lines of steamers, and also communicates directly with the Mississippi hydrographic system by means of a navigable canal which traverses the state from north to south, terminating at *Portsmouth* at the confluence of the Ohio and Scioto rivers. The harbour, protected by two piers extending 1,200 feet into the lake, and enclosing a space of 185 acres, affords excellent accommodation for a commercial navy, which is already the largest in the lacustrine waters, and which is yearly increased by numerous vessels launched from the neighbouring dock-

yards. A magnificent railway viaduct, 3,210 feet long, crosses the broad ravine of the Cuyahoga, affording a wide prospect of the city, its parks, harbour, shipping, and the "Crib," an imposing structure marking the spot where the pure water of the lake is captured and conveyed by tunnel to the mainland to supply the wants of the city.

Cleveland possesses several learned and scientific institutions, such as the Ohio State and Union Law College, the Cleveland Medical and Homœopathic Colleges, the medical department of the Wooster University, the Public School Library and a United States marine hospital. *Oberlin*, 34 miles south-west of Cleveland, is the site of a famous college, open equally to both sexes and to all races.

Fig. 123.—Sandusky.

Scale 1 · 400,000.



Sandusky, another port on Lake Erie, is invisible from the lake itself. It stands on the south side of an almost landlocked inlet, which is sheltered on the north-west by a low peninsula, connected by a succession of islands, islets and shoals with the Canadian promontory of Point Pelée towards the north-west end of the lake. Sandusky Bay forms a spacious well-protected harbour 15 miles long and 5 miles broad, approached from the east side, where Spit and Bull's islands form natural breakwaters.

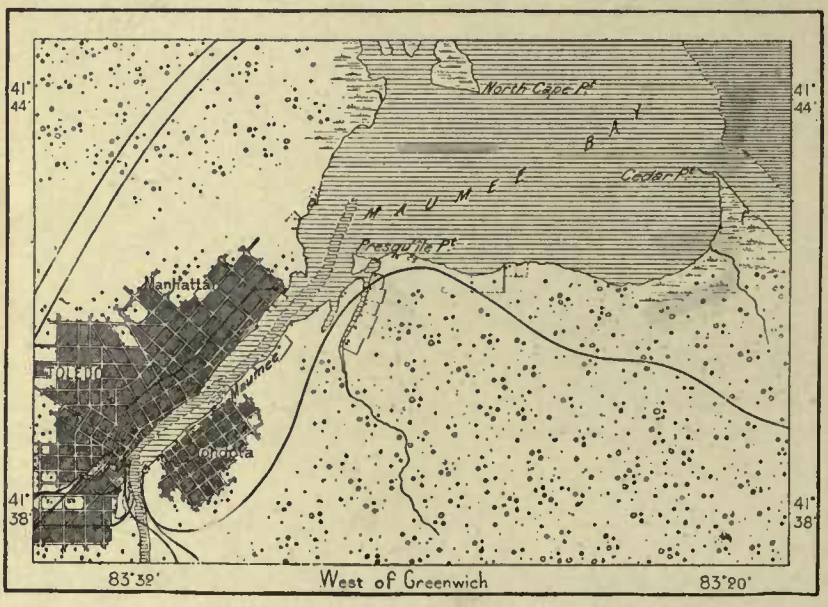
The shores of the bay and the banks of the Sandusky River, which flows north to its western extremity, were formerly inhabited by a branch of the Wyandott or Huron nation, and the French military post of Fort Junandat was erected in 1754

not far from the spot where sixty-two years later the Americans founded the present city. The local trade employs a considerable fleet of coasters and fishing-smacks, less numerous, however, than those of *Toledo*, which stands near the mouth of the river Maumee. Toledo thus occupies a position at the western extremity of Lake Erie analogous to that of Buffalo on the Niagara effluent at the opposite end. The rapid growth of Toledo compared with other cities of Ohio is due especially to the navigable converging canals by which this lacustrine port communicates across the states of Ohio and Indiana with the Miami, the Wabash, and the whole system of Mississippi waters. Formerly the valley of the Maumee River was a vast morass, the Black Swamp, which by drainage has been almost entirely transformed to a highly productive plain.

South of Toledo the town of *Findlay* occupies the site of a camping ground

Fig. 124.—Toledo.

Scale 1 : 200,000.



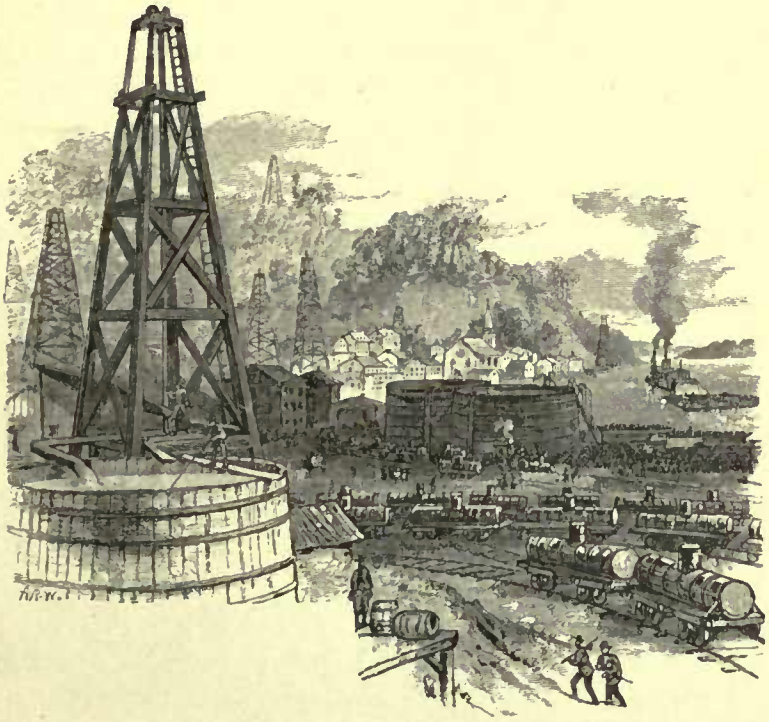
of Shawnee Indians formerly commanded by the Frenchman, Blanchard, whose name survives in Blanchard's Fork, one of the Maumee head-streams. Findlay has recently acquired a sudden celebrity and importance as one of the richest centres of natural gas. The inhabitants of the district had long noticed certain "blowers," whose jets had even been utilised for lighting and warming a neighbouring house. This led to a systematic exploration, which revealed the existence of vast underground reservoirs, and in 1889 over thirty shafts were already yielding about 100,000,000 cubic feet a day. From the Karg Well, which is said to be the most copious in existence, the gas escapes with the roar of a cataract.

Lima, south-west of Findlay, stands on underground lakes of petroleum, which are connected with Chicago and other towns by means of metal pipes. The oil of

the Lima district, being denser than that of Pennsylvania, is used as fuel instead of coal, especially in the factories.

Numerous towns follow along the north bank of the Ohio, which forms the boundary of the state. Such are *Steubenville*, an industrial dependency of Pittsburg, and *Bellaire*, five miles below Wheeling, metropolis of West Virginia. *Marietta*, so named in honour of Marie-Antoinette, stands at the confluence of the Ohio with the Muskingum, on a terrace which was formerly occupied by Indian fortifications. Marietta is the oldest American settlement in Ohio, but before

Fig. 125.—The Oil Industry: Petroleum Wells.



1788, the year of its foundation, the French had already established several stations on the southern shores of Lake Erie.

Gallipolis, capital of Gallia County, on the Ohio 20 miles below *Pomeroy*, is also a place of French origin. The "Scioto Company," an association of speculators, had contrived by dazzling promises to beguile some five hundred Frenchmen, who were induced to settle on a swampy clearing on the right bank of the Ohio, a short distance below the Kanawha confluence; a third of the immigrants were soon swept away by marsh fever. In the valley of the Mahoning, whose lower course joins the Ohio below Pittsburg, the chief place is *Youngstown*, 66 miles south-east of Cleveland. Lower down follows the valley of the Muskingum, which falls into the Ohio at Marietta, and in whose upper course the most important places are *Canton* and the industrial town of *Zanesville* at the head of the slack water navigation for steamers.

A more important centre of population and the industries is the valley of the Scioto, which joins the Ohio at Portsmouth. Here is situated *Columbus*, capital and third city of Ohio. The public buildings belonging to the State capital—capitol, arsenals, hospitals, schools—have all been constructed on a scale of considerable magnitude and splendour. Lying not far from the geometrical centre of the state towards the converging-point of the headwaters of the Scioto, Columbus has become the natural depôt for the agricultural produce of an extensive region and one of the chief centres of the coal and metallurgic industries. When this place was chosen in 1812 as the site of the future state capital the district was still under primeval forest. It had been preceded as the administrative centre by the city of *Chillicothe*, which lies lower down in the same valley of the Scioto some 50 miles by rail south from Columbus. Indian mounds and fortifications are very numerous in the surrounding district, and especially at *Fort Ancient* on the Little Miami River, whose wonderful fortifications have been explored by Mr. Moorehead.

Cincinnati, the largest and most flourishing city in the state, occupies two terraces rising 60 and 112 feet respectively above the right bank of the Ohio opposite the confluence of the Licking River. *Losantiville*, as the original settlement was called, was founded about the beginning of the year 1789, and afterwards renamed Cincinnati in honour of a company of veterans who, like the famous Roman general, had returned to the plough after the wars. For a long time its growth was extremely slow, but after the opening of the Ohio River to navigation it began to make rapid progress, the population advancing from 24,000 in 1830 and 115,000 in 1850, to 216,000 in 1870 and about 300,000 in 1890. Including the towns and boroughs lying within a radius of 12 miles, with the two Kentucky cities of *Newport* and *Covington* facing it on the left bank of the Ohio, and separated from each other by the Licking, including also the other outlying suburbs of *Bromley* and *Ludlow* in the west and *Bellevue* and *Dayton* in the east, but all on the Kentucky side, the total present population certainly exceeds 400,000. From the terrace where were constructed the first log huts, the growing city gradually invaded the slopes of the surrounding hills of Silurian limestone, then all the crests were covered, and the suburban quarters with their numerous villas and private residences still continue steadily to encroach on the neighbouring uplands. The river front already extends a distance of 10 miles, while the Kentucky dependencies are connected with the city proper by five viaducts and a remarkably elegant suspension bridge with a central sweep of 1,000 feet. The heights on the east side are occupied by Eden Park, or "the Garden of Eden," as it is familiarly called, a magnificent rural retreat, 220 acres in extent, from which a splendid prospect is commanded of the city, the broad winding stream alive with steamers, ferryboats, and other craft, the distant towns, slopes and plains of the fertile Ohio valley. Several other parks and public grounds add to the beauty and health of the place, while the cemetery of Spring Grove, one of the most picturesque in the Union, covers a space of over 600 acres in the northern outskirts.

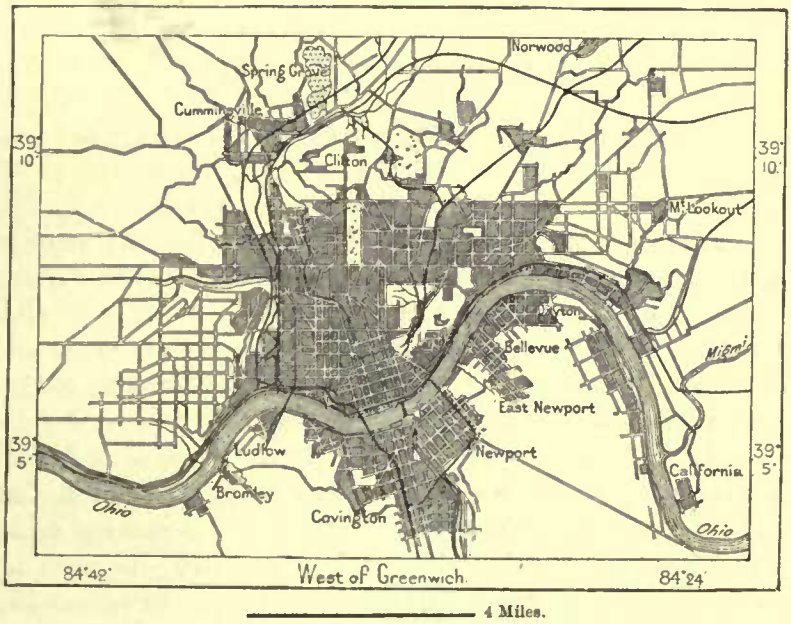
Cincinnati, the natural outlet for the produce of the Licking and upper Ohio

CINCINNATI BRIDGE.

basins, is also the chief mart for the two valleys of the Great and Little Miami Rivers, which descend in parallel channels towards the Ohio west and east of the city. Such natural advantages, though not to be compared with those of Saint Louis and Chicago, the two great trading centres of the West, have nevertheless had much influence in promoting the general prosperity of the place. Extensive industrial quarters are occupied with furniture and clothing factories, breweries, flour mills, refineries, and workshops of all kinds, besides the pig shambles and pork-packing business whence the nickname of "Porcopolis," now, however, more commonly attributed to Chicago. Cincinnati makes it a point of honour to cultivate the arts and promote general instruction. She is specially proud of her university, college of music and other large educational establishments. A school

Fig. 126.—Cincinnati.

Scale 1 : 230.000.



of art is attached to the museum, the public library contains 200,000 volumes, the zoological and botanic gardens are both well stocked, and the taste for the liberal arts is widespread, as shown by the numerous collectors of books, paintings, prints, and archæological remains.

Hamilton, which lies 30 miles due north of Cincinnati, may be regarded as the port of the metropolis on the Great Miami River. *Dayton*, higher up in the same valley, is the converging-point of several railways, and is fast becoming the chief industrial centre on the lines connecting Cincinnati with Toledo and Columbus with Indianapolis. A little to the south of Dayton stands the *Great Mound*, which rises to a height of 65 feet on a base 800 feet both ways. These dimensions are rivalled only by one other mound near Wheeling. *Springfield*, in the same valley of the Great Miami, 24 miles north-east of Dayton, is noted for the manufacture

of agricultural machinery. Springfield is also associated with the Indian wars. In the neighbourhood was born the famous Shawnee chief, Tecumseh, who offered such a valiant resistance to the white settlers.

3.—Indiana.

The State of Indiana has long ceased to justify its name; in the year 1790 the extermination of the native tribes had already begun on the Maumee and upper Wabash Rivers, and twenty-two years later the struggle was brought to a close by the complete destruction of the Shawnee League. The few survivors who still lingered in the forest glades were removed beyond the Mississippi in the year 1841. Like those of the neighbouring states of Ohio and Illinois, the first white settlers were Franco-Canadians who had married native wives. Hence, when the English annexed this region in 1763, they found numerous French half-breeds living in peaceful association with the surrounding aborigines.

The present State of Indiana, bounded south and south-east by the Ohio River, south-west by the Wabash, and north-west by the southern extremity of Lake Michigan, is elsewhere limited by purely conventional lines. The conterminous states are Michigan on the north, Ohio on the east, Kentucky and Illinois on the south and west respectively. Viewed as a whole, Indiana may be described as a rolling plain which rises in rounded ridges towards the watersheds. Few regions abound more in arable lands, or possess greater facilities of communication for general traffic. The engineers found little difficulty in developing an extensive network of railways and of navigable canals connecting the Ohio River with the basin of the Great Lakes. Indiana is also an important mining state, and its rich deposits of bituminous coal yielded over 3,100,000 tons in the year 1888. Lastly a great part of the eastern region between Indianapolis and Fort Wayne is now found to possess extensive reservoirs of petroleum and natural gas.

Below Cincinnati, the Ohio skirts the borders of Switzerland County, so named, not from its modest eminences, but in memory of a colony of settlers from the Canton of Vaud, who vainly endeavoured to introduce viticulture into their adopted land. The town of *Vevay* recalls those early essays at colonisation, which date from the year 1813. Lower down, *Madison* is followed by *Jeffersonville* and *New Albany*, which, although forming distinct municipalities, are in reality mere suburbs of the city of Louisville, on the opposite or Kentucky side of the river. New Albany, which lies flush with the stream, creeping half-way up the slopes below the falls, shares in the vast industrial and commercial movement of its Kentucky neighbour.

Despite the advantages derived from its proximity to Louisville, New Albany has already been outstripped by *Evansville*, which is the busiest riverine port on the banks of the Ohio between Louisville and the Mississippi confluence. Although founded so recently as the year 1836, Evansville takes the second position in the state for population, while rivalling the capital itself in commercial activity. It could not fail to rapidly develop into a great industrial and trading centre, thanks to its advantageous position on the banks of a large navigable

waterway, a short distance below the mouth of the Green River, giving access to one of the richest valleys in Kentucky, and, moreover, forming a natural outlet for the agricultural and mineral produce of an extremely fertile district of Indiana, abounding in deposits of coal and iron ores. These natural advantages have been further increased by the development of the railway system and the construction of a navigable canal 460 miles long, connecting Evansville with Lake Erie through the Wabash valley. About half-way between Evansville and New Albany, and not far from the banks of the Ohio, is situated the famous *Wyandott Cave*, whose galleries have a total length of 23 miles, and whose stalactite formations exceed those of the Mammoth Cave of Kentucky in size and diversity of form.

Towards the north-east angle of the state rise the farthest headstreams of the Wabash, which lower down is joined by numerous tributaries ramifying in all directions. The city of *Fort Wayne*, although situated near the sources of the Maumee affluent of Lake Erie, may nevertheless be regarded as also belonging to the Wabash basin ; it stands on the very crest of the waterparting, whence the title of *Summit City* often attributed to it. Originally a camping-ground of the Miami Indians, it afterwards became a trading-station belonging to the Franco-Canadians, and in the year 1764 the English here erected a little fort, round which the settlers grouped themselves in constantly increasing numbers. At present it is a flourishing commercial mart on the railway between Pittsburg and Chicago, about 150 miles south-east of the latter city.

As indicated by its French name, *Terre Haute* stands on "high ground," some 60 feet above the east or left bank of the Wabash, 74 miles south-west of Indianapolis. A few descendants of its Franco-Canadian founders still reside in this busy agricultural centre, which does a brisk export trade in grain, flour and manufactured goods. *Vincennes*, another Franco-Canadian settlement lower down the Wabash, dates from the year 1735. It was formerly a military station guarding the trade route between Lake Erie and the Mississippi. Later it was chosen as the capital of Indiana when that region was first organised as a territory in 1800. At that time Indiana included Wisconsin, Michigan, Illinois, and parts of Minnesota and Ohio, Illinois being detached, also first as a territory, in 1809, and Indiana finally reduced to its present limits and admitted into the Union as a state in 1816. Vincennes had ceased to be the capital in 1813.

The founders of *Indianapolis*, the present capital and chief city in the state, conformed to the general practice in selecting for its site a spot as nearly as possible in the geometrical centre of the country. It lies 110 miles north-west of Cincinnati on a level plain watered by the White River, which has a south-westerly course of about 300 miles, joining the left bank of the Wabash 25 miles below Vincennes. In 1820 the whole district was still a vast forest without any clearings, but in that year the ground chosen for the new state capital was laid out in the usual chessboard fashion, broken however by four main thoroughfares, converging diagonally on a circular park which now occupies the centre of the city. Later, Indianapolis became the terminus of a large number of railways, which,

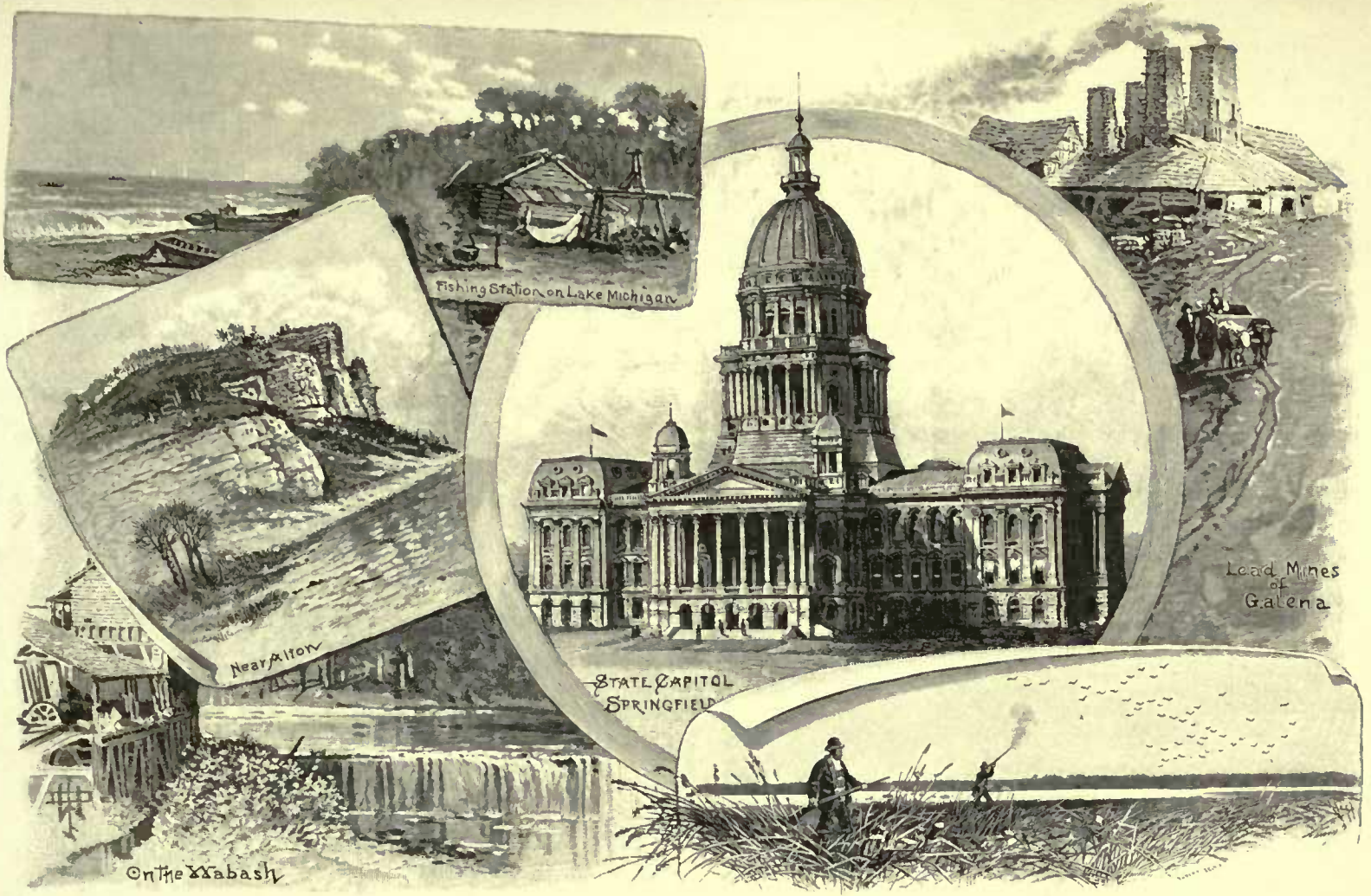
combined with its political advantages, rapidly attracted settlers from all quarters. It has thus become one of the great cities of the West, with a population which has more than doubled itself in two decades, advancing from 48,000 in 1870 to over 107,000 in 1890. Although very clean and well administered, the city from its level position and general plan is necessarily somewhat monotonous; its uniformity, however, is relieved by many fine buildings, such as the Court-house, the State Library, and especially the new State House or Capitol.

There are a few important towns in the northern part of Indiana near Lake Michigan, and consequently lying within the sphere of influence of Chicago. One of the largest of these places is *South Bend*, so named from its position on the southern curve of the St. Joseph affluent of Lake Michigan. Franco-Canadian settlers are numerous in the district, and the city is a sort of religious metropolis for the Roman Catholics of Indiana, who are said to outnumber all other Christian communities in the state. In the neighbourhood is the Catholic University of Notre-Dame. The river is navigable for small steamers as far as South Bend. *Michigan City*, on the lake itself, 38 miles by water south-east of Chicago, has the distinction of being the lacustrine port of Indiana.

4.—Illinois.

Illinois is one of those favoured regions which unite within themselves all geographical advantages, those even which might seem mutually to exclude each other. On the one hand it is essentially a continental land, occupying the centre of the upper Mississippi drainage area, and lying at the necessary point of intersection of the great commercial highways which run north and south through the central depression, and east and west from ocean to ocean; on the other hand it possesses all the resources of an insular country, thanks to its position in the heart of a vast system of navigable inland waters. Towards the west the Mississippi, southwards the Ohio, on the east the Wabash, to the north the Rock, the Illinois and the magnificent Lake Michigan form a girdle of riverine and lacustrine ports round about this privileged territory which, even before the development of the railway system, was able to forward the produce of its soil directly to every quarter of the globe. The Atlantic Ocean itself is accessible by water through the Saint Lawrence, the recently enlarged navigable canals and the continuous chain of Great Lakes forming collectively a vast inland sea which penetrates over 1,000 miles right into the heart of the mainland.

The soil of Illinois is extremely fertile, consisting largely of old alluvia and drift, much mixed with vegetable humus. Even before a tenth of the land had been brought under tillage, Chicago, the emporium of Lake Michigan, already held the foremost position for its export trade in wheat and flour. No other region is more suitable for agriculture, needing scarcely any preliminary clearing. The surface rolls away in long billowy undulations, nowhere presenting any obstacle to the construction of highways, or to the transport of produce, excepting where intersected by the watercourses. The highest eminence scarcely exceeds



ILLINOIS.

820 feet above sea-level, while the lowest ground falls to 300 feet at the Mississippi-Ohio confluence.

Illinois has received the title of the "Prairie State," four-fifths of the surface having originally presented the characteristic features of the Western prairies, vast expanses of tall herbage which in many places stretched away beyond the horizon, relieved here and there by a few clumps of trees or patches of woodlands. But the natural prairie no longer exists, the wild flora almost everywhere having been replaced by cultivated plants. Illinois has limited supplies of lead and zinc ores in the north-west, but abundance of bituminous coal, which is widely distributed over three-fourths of the whole area. Hence, it is not surprising that the stream of immigration has been largely directed towards this state since the middle of the century, that is to say, since the first locomotives began to penetrate into these hitherto almost deserted western wilds. Although its organisation as a state dates only from the year 1818, Illinois already rivals New York and Pennsylvania in political influence, ranking high amongst the members of the Federal Union in population, trade, mineral and agricultural wealth.

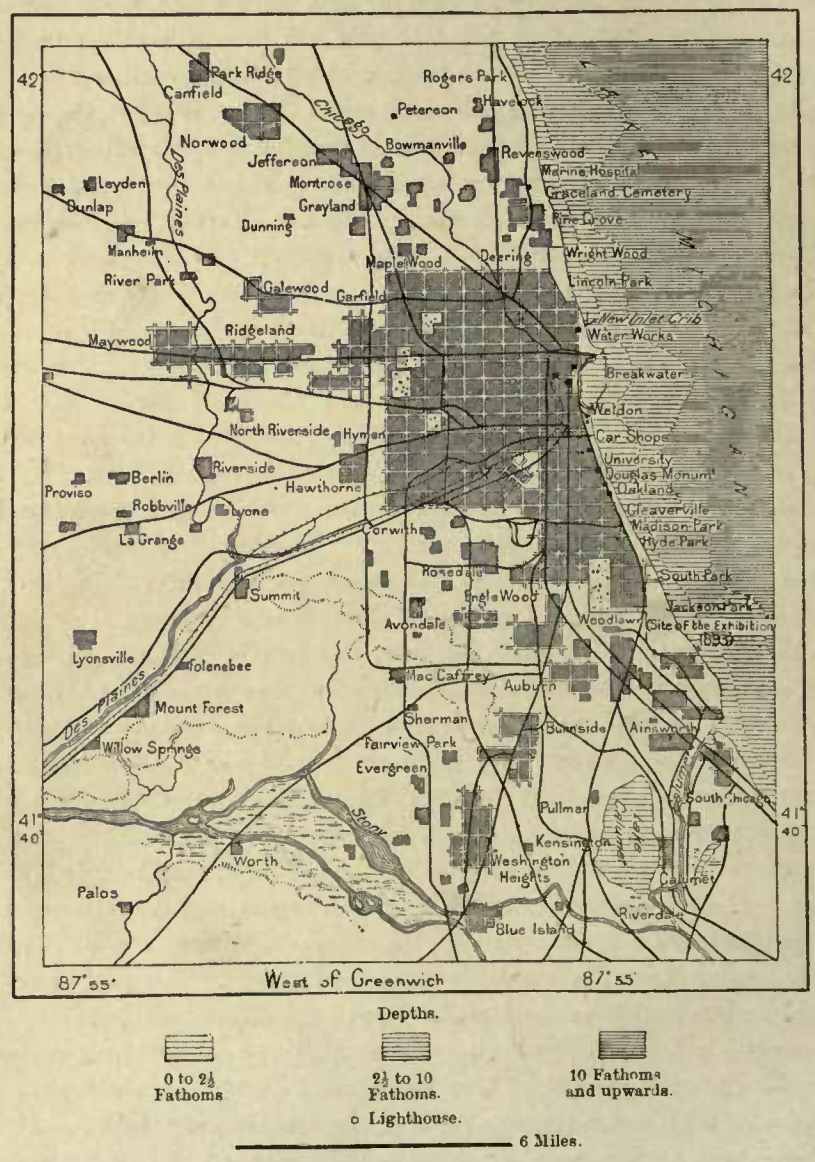
Since the Civil War *Chicago*, incomparably the largest city in the state, had already disputed with Cincinnati the title of "Queen of the West." But the census returns for 1890 revealed the astonishing fact that it has distanced Philadelphia in population, and is now pressing hard on New York itself. Most places are proud of their antiquity. Rome, which even traditionally is scarcely more than five-and-twenty centuries old, calls itself the "Eternal City," and in every land those are proud citizens who can point to monuments or ruins dating back one or two thousand years. Chicago, on the contrary, boasts of being the "Mushroom City," sprung, as it were, suddenly from the bowels of the earth. Far from seeking to go back to a remote origin, her citizens affect to pass over her beginnings in silence, as if she had come abruptly into existence by a miracle of human enterprise. Nevertheless, Chicago, as a matter of fact, is one of the oldest stations in North America mentioned in the records of the white settlers. In the year 1673, at a time when New York was still a Dutch colony, with a population of less than 2,000 souls, the portage of *Chikak-uk*, or "Place of Civets," had already been visited by Joliet. The point where Lake Michigan at a former period overflowed into the Mississippi basin, as still indicated by the swampy bayous of the district, marked the route leading from the lacustrine to the fluvial slope. All warlike or trading expeditions advancing from the Great Lakes to the Illinois affluent of the Mississippi necessarily followed this route. In consequence of its important strategic position the Federal Government here erected *Fort Dearborn* in the year 1804, and this station soon became a trysting-place of the traders and trappers. Gradually more permanent settlers were attracted to the spot, and although the fort was destroyed and the garrison massacred by the Indians in 1812, it was rebuilt four years later. Still the development of the district was very slow, being much retarded by the Indian troubles, and in 1830 not more than a dozen families were clustered round the station.

But then came the memorable gathering of the Pottawatomie nation at this spot

in 1833, when they ceded to the United States a vast domain estimated at about 20,000,000 acres, comprising the regions which now form the states of Illinois and Wisconsin. Four years after that event Chicago was incorporated as a city, with a population of a little over 4,000, and since then its progress has been prodi-

Fig. 127.—Chicago.

Scale 1 : 280,000.



gious, absolutely without a parallel in ancient or modern times. In forty years the population has risen by leaps and bounds from 30,000 in 1850 and 110,000 in 1860, to 300,000 in 1870, 500,000 in 1880, and 1,100,000 in 1890, thus more than doubling itself during the last decade. For a moment the prosperity of Chicago seemed to be arrested by the tremendous conflagration of 1871, a disaster un-

equalled in modern times since the Great Fire of London in 1666. As many as 17,450 houses were destroyed by the consuming element, and a space of about five square miles left strewn with calcined ruins. So extensive were the ravages

Fig 128.—Street View, Chicago

that the ashes of the burning houses were wafted all the way to the Azores, in mid Atlantic.

In anticipation of future expansion, the corporation has marked off on the shores of Lake Michigan, as municipal territory, a space of 160 square miles,

which is about the extent of the department of the Seine. Doubtless this territory is still far from being occupied, waste spaces being still numerous and extensive. But, on the other hand, the new quarters have in many places already overgrown the official limits. In 1890 the front of the city towards the lake had a total length of 23 miles, while the district covered with houses had a mean width of over six miles. But the centre of Chicago still lies in the same place where it first took its rise, that is, at the converging point of the north and south branches of the Chicago river, whose channels follow the depression of an ancient lacustrine beach on their course of about $1\frac{1}{4}$ mile to the lake. Starting from this central nucleus, the streets and avenues are continued from block to block, all regularly intersecting each other at right angles in the direction of the meridians and parallels of latitude. In this central quarter stand the loftiest and most sumptuous buildings, but the spongy soil could not have sustained their weight had they not been supported with substructures of piles, or else a kind of iron raft. Moreover, it would have been impossible for the surface waters to escape had not the very ground itself been raised. Formerly it stood at a height of not more than from 3 to 10 feet above the mean level of the lake; now it has been banked up from 12 or 14 feet to 25 feet, according to the elevation of the different quarters. Thus it became easy to drain the land and give it a sufficient incline to construct a complete system of sewerage, while at the same time raising the houses several feet. This levelling up of a whole city, ground, superstructures and all, which was effected without any accident, is justly regarded as a triumph of American engineering skill.

On the other hand, the audacity of the local builders reveals itself in the style of the principal edifices. The people of Chicago are specially ambitious of excelling in big things. Proud of inhabiting a city which has sprung up with such amazing rapidity, and recovered itself so spontaneously from the tremendous catastrophe of 1871, they aim also at possessing the tallest houses and buildings capable of accommodating the largest possible number of human beings. Certain monumental structures in the business quarters contain a day population of as many as 20,000, distributed in endless lines of offices piled up ten, fifteen, and even twenty stories high. The Auditorium is at once a vast hotel, where thousands of travellers can be comfortably accommodated, and a theatre spacious enough to entertain 8,000 spectators. Doubtless the big and the beautiful cannot always be harmonised, and many of these huge piles are constructed in a grotesque style without unity or taste. But the very conditions of an absolutely novel environment stimulate the local architects to feats of daring skill, and their audacity has often been crowned with success. They are mere imitators in the ornamental details; but the main features—outlines, general proportions, arrangement of the interior—have been necessarily subject to modification, and their work has here consequently assumed an original character.

The bayous traversing Chicago present little difficulty to the traffic; they are crossed by dozens of bridges, while the northern and southern quarters are further connected by two tunnels. Extensive hydraulic works have had to be executed in

the very lake itself, and in this direction considerable tracts have been reclaimed which are now intersected by railways in all directions. Vast quays several miles long have also been constructed to consolidate the soft beach which was formerly strewn with shifting dunes. An outer harbour, well sheltered by granite jetties against the north and east winds, communicates with the mouth of the Chicago River, and is connected by deep basins with the inner harbour formed by the channel of the stream itself. Lastly, two tunnels about two miles long penetrate under the bed of the lake to capture the 178,000,000 gallons of water needed for the daily requirements of the citizens. Taken at such a distance from the shore

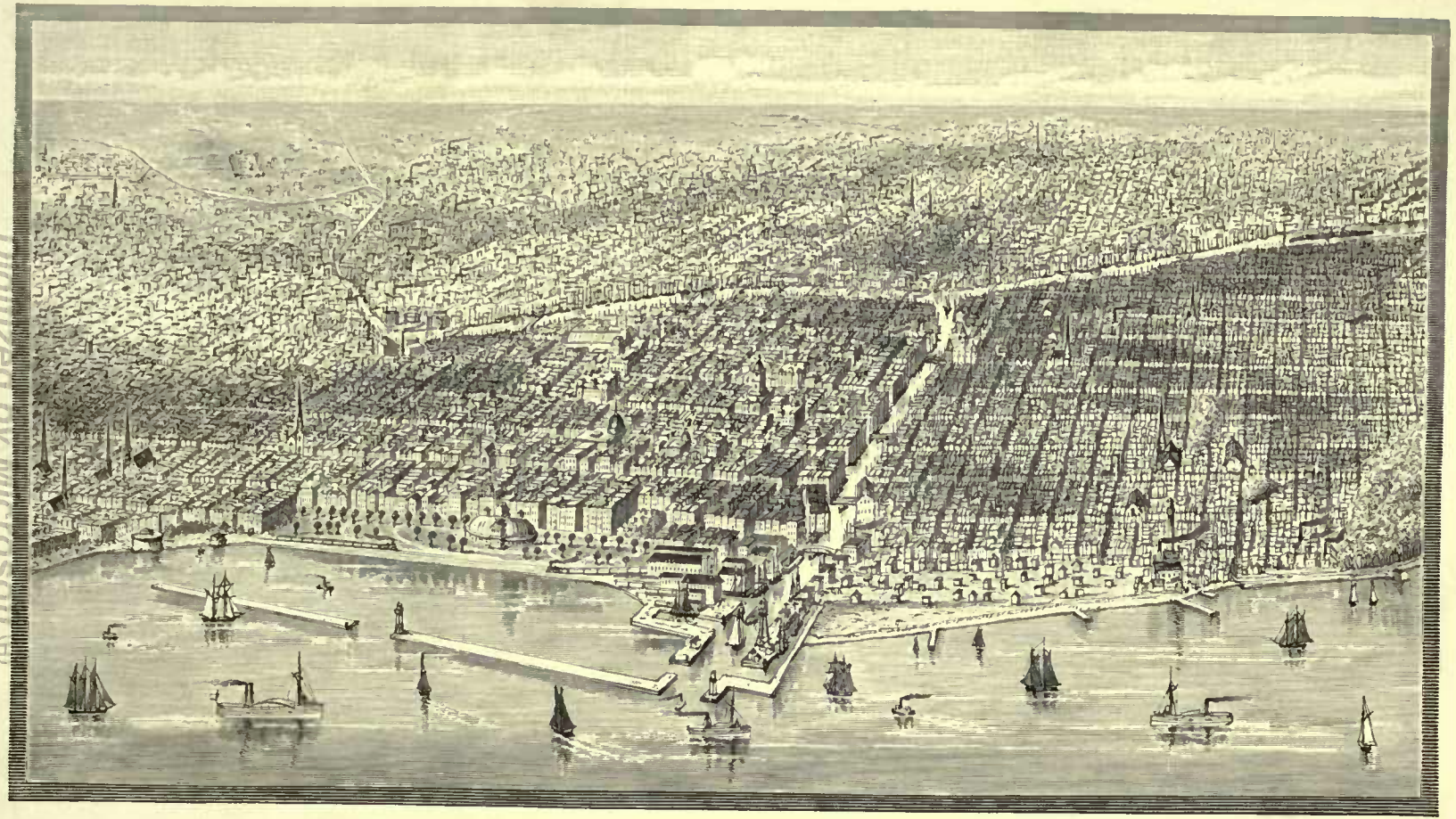
Fig. 129.—Chicago Water-Works, Lake Michigan.

it was hoped that the drinking water would always remain perfectly pure. Nevertheless the sewage discharged into the lake has been gradually diffused over the whole liquid mass, contaminating it to such an extent that great ravages were committed by an outbreak of typhoid fever in 1891. Hence it became urgently necessary to modify the whole system of drainage, and instead of flowing to the lake, the foul waters and sludge are now pumped up to a higher level and thus carried off by a canal to the Des Plaines tributary of the Mississippi.

In the interior of Chicago there is an absence of shady trees, but by way of compensation the municipality has reserved for public use a circular zone of boulevards and parks, the grassy plots and shubberies comprising a collective area of

1,000 acres. Northwards the shores of the lake are bordered by Lincoln Park, a charming stretch of rural scenery diversified with wooded heights, glens, and sparkling streams. To Lincoln Park on the north corresponds Jackson Park on the south side, and this is the site on which have been erected the chief buildings of the Universal Exhibition of 1893, such as the Great Nave of the States and of Foreign Nations, the Illinois Palace, the Halls devoted to the Industries, Machinery, and Agriculture. A new harbour communicating with the inner basins has been constructed near the park for the convenience of steamers and the yachting interests. Lake Front, another park situated near the centre just south of the chief harbour and of the mouth of the Chicago river, has been reserved for the edifices connected with the fine arts and education. There can be no doubt that this vast exhibition, the "Columbian World's Fair," destined to commemorate the fourth centenary of the discovery of the New World and especially to attest the greatness of the United States and the wealth of Chicago, is one of the grandest triumphs of human enterprise as well as the starting point for many new and important applications of industrial processes to the requirements of modern culture. Chicago itself is already an incomparable city, as a monument of the inventive faculty of man. The "Queen of the West" also aspires to become a great centre of the arts and sciences. But although it possesses several large colleges, an observatory, museums, an academy of science, an art institute, and although it is the chief market of the book trade in the West and publishes as many as 532 periodicals of all kinds (1891), its literary influence cannot yet compete with that of Boston or New York. Nevertheless in this department also Chicago aims at "big things." Recently it purchased at a single stroke a library of 280,000 volumes at Berlin for its new university.

But the chief glory of Chicago are its industries, and in this respect so rapid is the yearly progress that the statistical returns find it impossible to keep pace with the development of all branches of business and the steadily increasing value of the local products. Every branch of industry is represented in Chicago by establishments planned on the largest scale. But the most lucrative and highly-developed lines of business are those connected with the forwarding of cereals and flour, and with the slaughtering of cattle and pigs. The vast stockyards receive in a single year as many as 10,000,000 animals, which are fattened on the spot with the refuse of the distilleries, and which are then sent to the immense shambles, where they are rapidly despatched mainly by mechanical processes acting with unerring precision. At the very entrance the beasts are seized by a running noose, suspended by the feet to an iron triangle, and brought swiftly under the knife. The blood escapes along an inclined plane, while the carcasses continue to pass from the scalding and skinning chambers to the stalls where head and limbs are severed. Here the remains branch off in various directions, each part of the animal—flesh, fat, bones—pursuing their respective courses, while at each stage special hands subject them to the various processes by which they are finally prepared for the market. Such is the capacity of these establishments that as many as 10,000 beasts can be packed in a few hours. Thus are annually delivered to the trade of the world



GENERAL VIEW OF CHICAGO.

500,000 tons and 1,000,000,000 tins of canned meat valued at about $200,000,000. Such figures enable the political economist to realise the importance that the questions connected with "American provisions" have acquired in diplomatic negotiations with European Governments.

The trade of Chicago naturally expands with the development of the local industries. The 1,000 trains arriving every day by the 27 converging lines of railway bring on an average 175,000 travellers, while the post-office consigns 10,000 tons of letters and periodicals, the street cars propelled by steam or electricity carry 2,000,000 passengers, and as many as 60 vessels enter or clear the port in twenty-four hours. Thus this inland city, on the shores of Lake Michigan, already rivals the great European seaports in the yearly tonnage of its imports and exports. Trade might be directly carried on with Canada and Europe by the highway of the Great Lakes and the Saint Lawrence. But the railroads running straight to the Atlantic seaports offer such great facilities for the transport of goods that only a relatively small proportion of the exchange follows the roundabout waterway. Hence in 1890 not more than about 700 vessels, with a total burden of 279,000 tons, were engaged in the foreign trade of Chicago.

Numerous towns, either industrial dependencies or pleasure resorts, gravitate round about the great city. Such in the south is the extensive borough of *Pullman*, west of Lake Calumet, which belongs entirely to the builder of the well-known Pullman railway carriages, and which has been laid out by a single architect on a uniform plan adhered to in all its details. *Evanston*, 12 miles north of Chicago, on the shores of Lake Michigan, is also a dependency of the metropolis. Here is the seat of the North-western University (Methodist), one of the chief centres of education in Illinois, founded in the year 1854

On that section of the Mississippi which belongs to Illinois are situated several towns of secondary importance, all inferior in population to those of Iowa and Missouri, facing them on the opposite bank. *Galena*, at the north-west angle of the state, on the Fevre River six miles above the confluence, occupies the summit of a limestone bluff dominating a former channel of the stream. This place has lost much of its importance since the exhaustion of most of its zinc and copper deposits as well as of the galena (lead) mines whence it took its name in 1822. A busier and larger place is the modern town of *Rockford*, which lies midway between Galena and Chicago, and which has become the chief market for an extensive agricultural district. Two other manufacturing towns, *Moline* and *Rock Island*, stand on the Illinois side of the Mississippi above its confluence with the Rock River. They are connected with each other by an urban railway four miles long, and with the much larger city of Davenport on the Iowa side by a noble wrought-iron railway bridge which crosses the Mississippi at this point. The factories of all these places derive their motive power from the rapids of the Mississippi, which are very strong, especially in the narrow channel rushing between Rock Island and the mainland at Moline. The island, which is three miles long and connected by bridges with both banks of the river, lies between the conterminous states and has become the property of the Federal Government. Here have

been formed a great central arsenal, with a large armoury, a foundry, and military headquarters, while the lovely island itself has been transformed to a magnificent public park.

Next to the Chicago district the most important section of the state is the basin of the Illinois River, which has received its name and transferred it to the state from a now extinct tribe of Algonquian Indians. The Illinois River always formed the natural highway between Lake Michigan and the Mississippi; hence the stream of traffic still continues to flow almost exclusively along the lines of railway that have since been constructed in the same direction between Chicago and Saint Louis. Numerous manufacturing towns have already sprung up along the upper reaches and on the headwaters of the Illinois. *Joliet*, which perpetuates the memory of the great explorer, skirts the banks of the Des Plaines River, about 38 miles south-west of Chicago. *Elgin* and *Aurora*, both on the Fox River, which joins the Illinois at *Ottawa* after a course of over 200 miles, possess large watch-works, woollen factories, railway-carriage works and flour-mills. *Kankakee*, on the river of like name, is a pleasant rural retreat much frequented by the citizens of Chicago, from which it is distant 56 miles to the south-east. The Kankakee River has a sluggish course of about 230 miles, flowing through the states of Indiana and Illinois mainly south-west to the Des Plaines, their junction forming the Illinois.

Below the confluence follow several busy places, and beyond Ottawa the left bank of the main stream is skirted by the cliffs to which the early French explorers gave the name of "long rocher," and which terminate in a terraced bluff steeply scarped on three sides. Here La Salle erected the fort of *Saint Louis* in 1682, and towards the end of the last century some Illinois Indians, at war with the Pottawatomies, seized and entrenched themselves in this stronghold. But being completely cut off from their supplies they all perished to a man; hence the name of *Starved Rock* by which this historic bluff is now known. Lower down follows *La Salle*, which recalls the expeditions of the renowned explorer. Steamers ascend the Illinois to this place, which is the western terminus of the Illinois canal. Farther on, the north or right bank of the Illinois is occupied by *Peru*, not far from La Salle, and *Peoria*, at the head of the plain where the river expands into a very elongated lake. Peoria, which retains the name of an extinct Indian tribe, stands on the site of the "Ville à Mallet," an old Canadian fort 160 miles south-west of Chicago. *Springfield*, which lies 45 miles farther south on a prairie watered by the Sangamon affluent of the Illinois, has been the seat of the administration since 1837, though not incorporated as a city till 1840; it possesses one of the finest state houses in the Union, a noble building erected at a cost of $5,000,000. It lies in an extremely fertile district abounding in coal, and is also noted as having long been the residence of Abraham Lincoln. The remains of the illustrious president here repose within the crypt of the National Monument, erected to his memory at an outlay of over $250,000, in the neighbouring Oak Ridge Cemetery. *Bloomington*, which lies farther east, is also one of the most flourishing industrial towns of Illinois, thanks to its rich coal-mines and the numerous converging lines

of railway. The municipal district of *Normal*, so named from the Illinois State Normal University, founded in 1857, is a mere suburb of Bloomington.

In the lower part of its course the Illinois, ceasing to flow south-west, takes the direction from north to south parallel with the Mississippi. The consequence is that the stream of trade also is abruptly deflected to the west in order to seek the nearest and easiest outlet. The city of *Quincy*, which crowns a limestone bluff 125 feet above the left bank of the Mississippi, serves as the riverine port of this traffic. Besides other industries here is an immense tobacco factory employing over 1,000 hands. Lower down *Alton* occupies what at first sight seems an admirable position on a terrace commanding the left bank of the Mississippi just below the Illinois confluence, and almost immediately above the mouth of the Missouri, that is to say, at the point of intersection of the great hydrographic lines from the Rocky Mountains to the Canadian lakes and from Lake Winnipeg to the Gulf of Mexico. But despite these advantages Alton has remained a small stationary town, with a population in 1890 of scarcely more than 10,000. But all the industrial and commercial life of this region has been attracted to Saint Louis, which enjoys the same advantages although somewhat more distant from the converging point of the fluvial valleys. Even the business quarter of *East Saint Louis*, facing Saint Louis on the Illinois side of the Mississippi, has acquired more importance than Alton, despite its girdle of swamps and backwaters. A vast space is here occupied by the stockyards or cattle enclosures of the National Stockyard Company, which cover many hundred acres, and are said to be the largest in the Union. *Belleville*, which crowns the neighbouring heights, is an important agricultural centre which may also be regarded as a commercial dependency of Saint Louis. The two old French settlements of *Cakokia* and *Kaskaskia*, both on the east or Illinois side of the Mississippi, have remained obscure groups of log huts, while great cities are springing up east and west on the surrounding prairies. Yet Kaskaskia, which dates from about the year 1673, was the first capital of Illinois Territory. It takes its name from the Kaskaskia River, which flows for nearly 300 miles through Illinois south-west to the Mississippi at *Chester*. Near Kaskaskia are the ruins of the old French station of *Fort Chartres*, whose crumbling walls are being gradually eaten away by the Mississippi current.

The town situated on the sharp peninsula of southern Illinois between the Mississippi and Ohio Rivers, received from its ambitious founders the name of *Cairo*, and the Mesopotamia of which it occupies the extremity was even called "Egypt." It might well be supposed that such a position at the intersection of the main highways 180 miles below Saint Louis, and in the exact hydrographic centre of the United States, could not fail to give birth to a great city. The surrounding low-lying muddy tracts, though subject to constant inundations, became the battlefield of eager speculators, and efforts were made to attract settlers by visions of rapid wealth. Thousands accordingly made their way to the district, but for the most part only to find fever and ruin. In *Martin Chuzzlewit*, one of his best-known novels, Charles Dickens describes the miseries of some of the unfortunate dupes lost amid this mud and slush of "Eden City," where they were constantly exposed

to floods or ague. But since then things have vastly improved, and Cairo has become a flourishing trading place, completely protected from the inundations by a costly levee from 20 to 24 feet high. The Mississippi, however, still continues to eat away the neck of the peninsula higher up, and will perhaps end by transforming it to an island.

5.—Michigan.

Lake Michigan gives its name to two completely detached peninsulas, which nevertheless are politically united in a single state. These are East Michigan, or the "Southern Peninsula," lying between the three Great Lakes, Michigan, Huron, and Erie; and West Michigan, or the "Northern Peninsula," which is washed on the south by Lake Michigan and the large inlet of Green Bay, on the north by Lake Superior. Between the two peninsulas flows Mackinac Strait, through which Lake Michigan communicates with Lake Huron. East Michigan, forming by far the larger section of the state, seems at one time to have for the most part constituted the bed of a lacustrine depression. Here the surface is either low-lying or but slightly elevated, forming a vast rolling plain which is traversed by long lines of moraines formerly deposited by the northern icecap and in certain places rising to a height of over 160 feet. Other rising grounds on the eastern shores of Lake Michigan attain an equal elevation. These, however, are not moraines but shifting dunes, which are continually driving before the winds and incessantly modifying the outlines of the sandy spits and headlands along the coast, and of the old inlets now transformed to completely landlocked lagoons. Thanks to the fertility of its soil and the mild lacustrine climate, East Michigan is an extremely rich agricultural region. Formerly it was extensively wooded, the prevailing species being oaks in the southern and white pine in the northern districts; but the old forests have almost everywhere been greatly thinned. Below the surface are stored vast quantities of bituminous coal, which represents as fuel a reserved supply of heat far superior to successive generations of timber, but which at the same time begrimes the towns with its black smoke.

The northern peninsula differs altogether in its geological structure from the southern division of the "Wolverine State," as Michigan is popularly called. Broadly speaking, it presents the aspect of an arid rocky region over 1,000 feet high formed by sandstones overlying a granite base, and disposed in the direction from east to west. Here are no placid streams meandering through level plains, but wild torrents rushing over rapids or cascades down to one or other of the surrounding lakes. Yet although there is little land suitable for tillage, this section has become, comparatively speaking, the wealthier of the two Michigans, thanks to its immense deposits of pure or nearly pure native copper and of magnetic and other iron ores of unrivalled excellency. The copper-beds of the Mineral or Copper Range, which were certainly worked in pre-Columbian times, are amongst the most productive in the Union, and these, taken in connection with the adjacent beds of high-grade iron ores, constitute the peninsula one of the most productive mineral regions in the world.

Like Maine, Michigan is connected in its historic development with Canada.

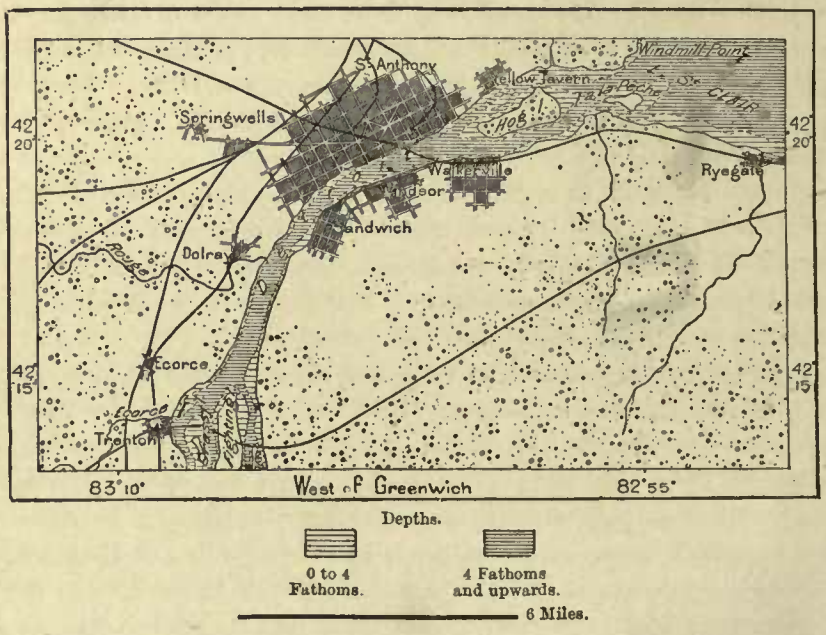
After its discovery in the first half of the seventeenth century by the French traders and missionaries, it was visited by the Canadian trappers and half-breeds, who here founded several settlements. In 1763 it passed with the rest of Canada into the hands of the English, who even after the War of Independence still endeavoured to retain Michigan as originally forming part of the French possessions, and actually continued to occupy the strategic post of Detroit down to the year 1796, when the whole region was evacuated. During the subsequent war of 1813-14 between the United States and Great Britain, several conflicts took place round about this key of the Great Lakes, and the Indian allies of the English afterwards paid with their lives or exile for the part they took in the war. At present none of the aborigines survive in Michigan except the few confined to two reserves, one in each section of the state. In 1805 Michigan Territory was formed out of the old North-west Territory, but it comprised a far more extensive region than the present state, at one time stretching westwards to the Missouri River, and including the whole of Wisconsin, Iowa, and Minnesota, besides part of Dakota. In 1837 the territory was broken up and Michigan within its present limits detached and admitted into the Union as an independent state. Since then it has progressed rapidly in wealth and population, thanks especially to the development of the mining and industrial interests.

The tide of European immigration began to set in the direction of this region towards the year 1840, after the settlement of Ohio and Indiana. At present there are relatively fewer Anglo-American colonists than in Ohio and Indiana. On the other hand the Franco-Canadian element is very largely represented in Michigan, in some districts having even the numerical superiority.

Like most of the other administrative centres of the Union, *Lansing* was chosen as the capital of the state solely on account of its central position in the valley of the Grand River, an eastern affluent of Lake Michigan. Although it has remained one of the humble cities of the West, Lansing occupies a vast space, and might, like Washington till recently, lay claim to the title of the "City of Magnificent Distances." Founded in 1837, it succeeded Detroit three years later as seat of the state legislature. But the former capital continues to be by far the largest city in Michigan. *Detroit* preserves at least in its written form, if not in pronunciation, the name given by the Franco-Canadian settlers to the fortified trading station founded by them in 1670. At the beginning of the eighteenth century it was chosen by Lamothe-Cadillac as the site of a little permanent settlement. But its admirable position on the "détroit" (strait) through which Lake Huron sends its overflow to Lake Erie must in any case have made it one of those indispensable marts which are independent of all political and commercial vicissitudes. Laid out on a somewhat less regular plan than that common to most Western cities, Detroit covers a space of about 21 square miles disposed chiefly along the right bank of the emissary, which at this point is over half a mile wide. Facing it on the opposite side is the Canadian town of Windsor, which is in reality a mere suburb of the Michigan city. The Detroit River, as the emissary is called, has a normal depth of from 30 to 40 feet. The strong current, which sweeps by the city at a velocity of 2½ miles

an hour, carries down the ice from Lake Saint Clair, and thus keeps open the navigation during the winter months. North-east of Detroit, which is a port of entry for the Federal Government, a canal 13 feet deep skirts the delta of the Saint Clair River where wind the shallow waters flowing from Lake Huron. The whole of the water-borne traffic of the three upper lakes, Superior, Michigan, and Huron necessarily passes by Detroit to reach the two lower lakes, Erie and Ontario; nor can it be deprived of this commanding position, at least until the projected navigable canal or ship-railway between Toronto and Georgian Bay has been constructed, thereby diverting the traffic towards the shorter and more direct route between Lakes Ontario and Huron. Besides its vast shipping trade Detroit also enjoys a considerable land traffic, thanks to the numerous railways converging at this point. One of these lines penetrates directly into the Canadian

Fig. 130.—Detroit.
Scale 1 : 280,000.



province of Ontario, through a tunnel 2,000 yards long, which has been excavated under the Saint Clair River at its issue from Lake Huron between the two cities of *Port Huron* on the American and Sarnia on the Canadian side.

Several beautiful little towns gravitate round Detroit, amongst others *Ann Arbor*, which is pleasantly situated on the Huron River, and on the direct railway to Chicago, about 40 miles west of Detroit. Here is the seat of the Michigan University, which was founded in 1837, and is liberally endowed by the state.

In the region washed by Saginaw Bay, an inlet of Lake Huron which penetrates far into the interior, all the larger centres of population are concentrated in the districts lying between the head of the bay and the state capital, and especially on the banks of the Saginaw River. Here is *Saginaw*, on both banks of the river, constituting one of the chief manufacturing centres in Michigan, and

deriving an immense amount of motive power from the rapids of the watercourses which here converge in a single channel 28 miles above the head of the bay. Steamers drawing 10 feet ascend as far as Saginaw, passing on their way the busy port of *Bay City* five miles from the lake.

Mackinaw City, at the northern extremity of the peninsula over against Saint Ignatius Point and Mackinac (Mackinaw) Island, is the "Gibraltar" of Michillimackinac ("Big Turtle") Strait, which flows between the two Michigan peninsulas. The possession of a fortified post to protect the peltry trade of this region was hotly contested by the French and English, and in 1763 the place was seized by the Sack and Saulteux Indians, though at that time held by a British garrison. The picturesque Mackinac Island is the property of the Federal Government, and has been transformed to a National Park much frequented by tourists during the season. On the coast, which trends round first to the south-west and then to the south, there follow several important places, such as *Muskegon*, *Grand Haven*, *South Haven* and *Saint Joseph*. Grand Haven, which lies at the mouth of the Grand River, is the port of *Grand Rapids*, a flourishing manufacturing centre and next to Detroit the largest city in Michigan. The rapids, from which it takes its name, have a total fall of over 16 feet in a distance of about a mile, and yield a considerable quantity of motive power to the numerous workshops in this busy district. The saline springs which abound both in this valley and in that of the Saginaw have given rise to a highly lucrative industry, the annual yield of salt in the Saginaw district alone averaging from 2,250,000 to 2,700,000 bushels. *Kalamazoo*, on the river of like name towards the south-western extremity of the peninsula, is another industrial place whose importance is rapidly increasing from decade to decade. Its population rose from about 9,000 in 1870 to nearly 18,000 in 1890, thus doubling itself in twenty years.

The rugged northern peninsula, with its rocky soil and severe climate, presents no sites favourably placed to become centres of attraction as agricultural or inland towns. But its exceedingly rich mineral stores, all lying in close proximity to deep and commodious havens, have developed a vast amount of activity amongst the neighbouring lacustrine ports. *Marquette*, one of the chief places in the peninsula, is one of those "Liverpools" which have sprung up on the southern shores of Lake Superior amid the solitudes of the Far West. Millions of tons of iron ores mined in the district are here shipped for every port on the Great Lakes, and even forwarded to Pittsburg, Johnstown, and the cities of the Atlantic seaboards. Great quantities of the ores are also smelted in large furnaces on the spot. A railway crossing the neck of the peninsula connects Marquette with the port of *Escanaba*, which stands on the north coast of Lake Michigan near the entrance to Green Bay. Other lines of railway run west towards *L'Anse* and *Ontonagon*, where much copper is mined and shipped, and also towards the workshops of *Bessemer* and *Ironwood* near the Wisconsin frontier. *Eagle River* and *Copper Harbour* on Keweenaw Point, which projects far into Lake Superior, export the copper of *Calumet* and of other districts where the metal is mined in the native state.

The trade of *Sault Sainte-Marie*, familiarly called *Soo* by the inhabitants of the

district, is of a totally different character. This twin city, Canadian on the north, American on the south side of the strait, serves as the forwarding station for merchandise of all kinds between Lake Superior and the lower lacustrine basins. Hence the prodigious development of its transit trade, which at present exceeds 8,000,000 tons a year. The goods are forwarded by steamers and other craft through the locked canal, by which the *sault* ("rapids") is turned on the Michigan side.

The Saulteux Indians, a branch of the Chippeways, have long disappeared from the district, and the old Franco-Canadian fur-trading station of Sault has taken rank amongst the industrial cities of the Union. The international railway bridge crossing the strait (St. Mary River) carries two of the trunk lines of North America, those running from Montreal to Duluth and to Minneapolis, and through these two places to the cities of the Pacific seaboard. The whitefish (*Coregonus albus*) exported from Le Sault, and regarded by epicures as without a rival, has recently been introduced into the other Great Lakes.

Near Grand Island between Marquette and Le Sault stand the high cliffs called "Portails" by the early French voyageurs, and "Pictured Rocks" by the Anglo-Americans. These cliffs are no less remarkable for their strange and picturesque forms than for the great diversity of their colours. The sandstone, limestone, and quartz rocks, superimposed to an average height of 300 feet, present the aspect of ramparts, towers, or pinnacles, or else project in overhanging masses pierced by caves and arcades. The most varied tints, pink, blue, green, blending with grey or brown hues, impart to these astonishing structures a fantastic or an enchanting appearance, according to the shifting play of light and shade.

6.—Wisconsin.

The State of Wisconsin, so named from the copious stream which the French pioneers called Mesconsin, and which joins the Mississippi three miles below Prairie du Chien, was detached like Michigan in 1836 from the vast North-west Territory ceded by Great Britain to the North American republic. At first it included the present states of Iowa and Minnesota; but the whole of the former and most of the latter region were separated from it in 1838, and ten years later Wisconsin, as at present constituted, was admitted into the Union. It is bounded westwards by the Mississippi and the Saint Croix River, which separate it from Iowa and Minnesota; southwards by a conventional line coinciding with 42° 30′ N. latitude, which separates it from Illinois; on the north the limits are Lake Superior and the peninsula lying between that lake and Green Bay, of which it has been deprived to the advantage of Michigan. The Montreal affluent of Lake Superior, the Menomence, flowing to Green Bay, and a straight line connecting both watercourses form the boundary in this direction. The Apostles Archipelago in Lake Superior also belongs to Wisconsin, while the larger Isle Royale has been attributed to Michigan. Lastly Lake Michigan forms the natural frontier on the east.

About two-thirds of Wisconsin are comprised in the Mississippi catchment basin: the part of its territory draining to Lake Superior is very narrow, while the section inclining towards Lake Michigan is much broader, thanks to the basin

of the Fox River, which was formerly an inlet of that inland sea, but which has been more than half dried up, Lake Winnebago being the only flooded depression of any size still remaining from the lacustrine epoch. The southern regions of the state, comprised within the zone of prairies, and enjoying a relatively mild climate, are by far the most densely peopled. Here the agricultural settlers find it possible to bring the land at once under cultivation without much preliminary labour in clearing the surface. But the settlement of the country proceeds at a much slower rate in the northern districts, which are more rocky, more arid and colder, and which were formerly almost entirely covered with pine forests.

The lead-mines in the south-western districts, and the iron ores on the shores of Lake Superior, have greatly contributed to the development of the state, while the mineral springs, although less numerous than those of West Virginia, attract more numerous visitors. Of foreign settlers the Germans and Scandinavians form the chief rural settlements, so much so that in certain districts English is scarcely current except in the towns. A numerous element are also the Franco-Canadians, descendants of those daring trappers and voyageurs who penetrated into the Far West so early as the first half of the seventeenth century, and who founded settlements at La Crosse, at Prairie du Chien, and elsewhere. The popular name of Wisconsin is the "Badger State."

Settlements are numerous, especially along the shores of Lake Michigan, north of Chicago. *Racine*, at the mouth of the Root River, which here forms a good harbour accessible to vessels drawing 10 or 12 feet of water, is a busy commercial and industrial place, doing a large trade in lumber and possessing extensive machinery, locomotive and wagon factories. Lying 60 miles north of Chicago and 25 miles south of Milwaukee, Racine shares in the prosperity of both of these great industrial centres. *Milwaukee*, an Anglicised form of a Winnebago term meaning "Fair Land," is, like Racine, of Franco-Canadian foundation. The first bartering station was here established by the trader Laframboise in the year 1785, and in 1818 an agricultural settlement was founded by Salomon Juneau, whose name is perpetuated in the magnificent park skirting the shores of Lake Michigan. Since 1840, when the inhabitants numbered less than 2,000, Milwaukee has made astonishing progress, its population advancing from 20,000 in 1850 and 71,000 in 1870 to 240,000 in 1890. Although not forming the numerical majority, as has been often asserted, the Germans are proportionately more numerous than in any other city of the North American Union. Milwaukee is by far the largest place in Wisconsin. It lies 90 miles north of Chicago on both banks of the Milwaukee River, which has a south-easterly course of nearly 100 miles, entering Lake Michigan at this point. Owing to the delicate creamy or straw colour of the bricks which are used in its construction, and which are manufactured on the spot and largely exported, the city presents a peculiarly striking appearance, with a frontage of about 6 miles along the cliffs skirting the lake. This privileged city is absolutely free from slums, which are so seldom absent from American towns. The whole of the sewage is heated in vast furnaces, where it is calcined, and the fertilising residuum distributed over the surround-

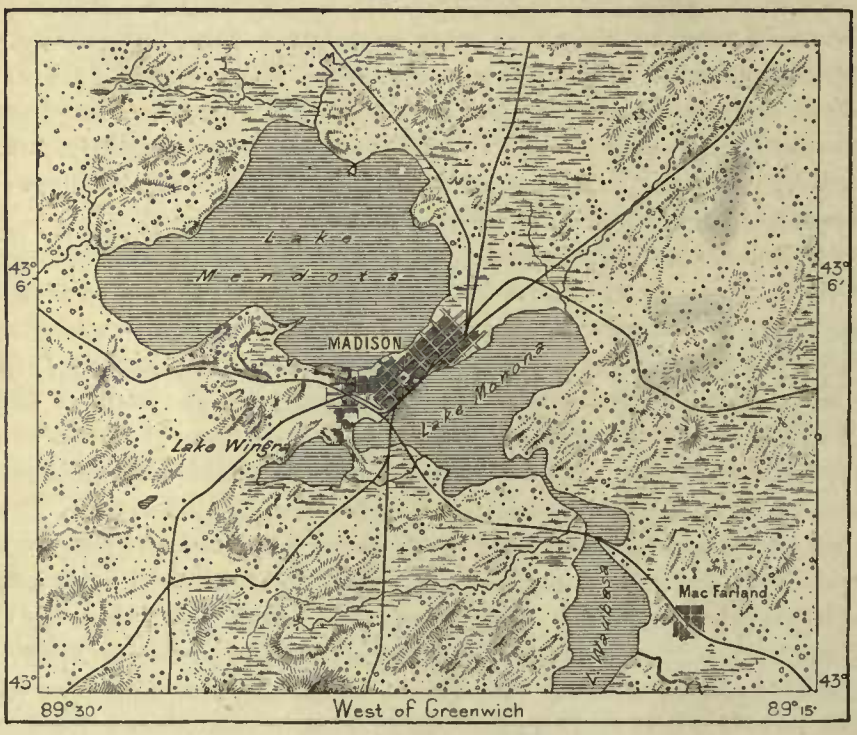
ing plains. The level of the river has also been raised by a system of locks, by means of which considerable driving power is supplied to the local workshops.

Since the completion of the recent harbour-works carried out at a great expenditure, this port is accessible to vessels of the heaviest draught, and has developed a trade larger than that of Havre. The collective annual burden of ships entered and cleared approaches 6,000,000 tons, while the mercantile navy owned by Milwaukee shippers numbered 371 vessels in 1890, with a total tonnage of over 90,000. The staples of the export trade are cereals and flour.

Madison, capital of the state, has not the advantage enjoyed by Milwaukee of being situated on the shores of Lake Michigan; it was chosen rather for the

Fig. 131.—Madison.

Scale 1 : 200,000.

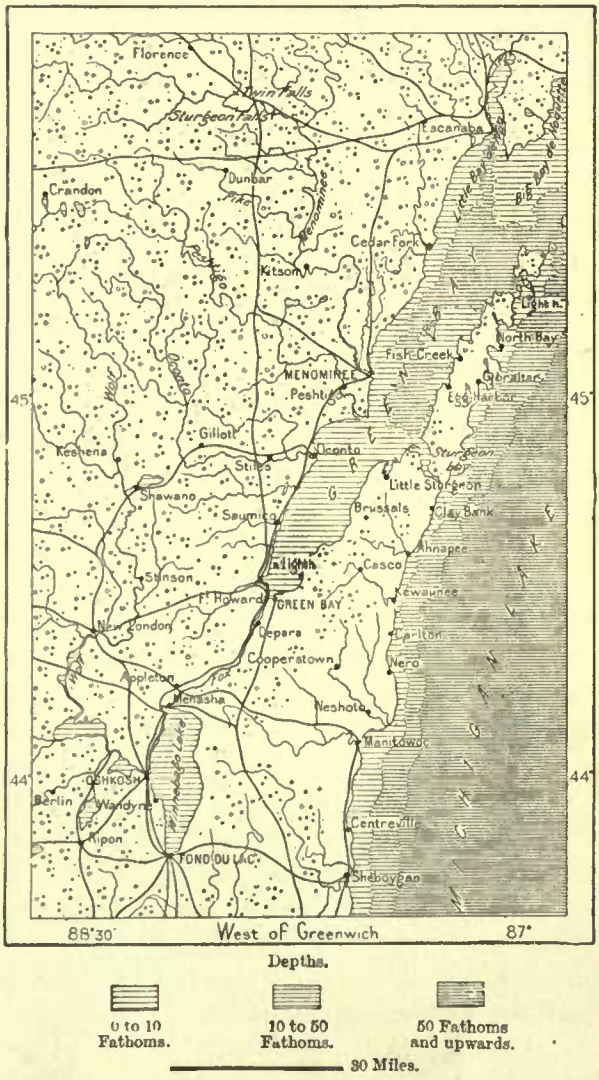


natural beauty of the environs than for any special commercial considerations. Here Lake Mendota, a lovely sheet of water fed by springs, partly fills a depression about 30 square miles in extent and varying in depth from 50 to 65 feet. The limpid waters of this depression, everywhere bordered with a margin of white sand, descend from step to step of three terraced lakelets, forming the upper basin of a torrent which descends to the Rock River affluent of the Mississippi. On the isthmus separating Mendota from Monona, the second basin, stands the city of Madison, encircled by a charming natural park, adorned with numerous gardens, and watered by sparkling rivulets. The magnificent capitol, erected at a cost of $500,000, occupies a commanding position in the centre of a public

park 70 feet above the level of the lakes. From this point all the streets run at right angles down to the surrounding waters, or lead to the neighbouring College Hill, which is crowned by the buildings of the University of Wisconsin. This picturesque city entered on a period of general prosperity after the completion of the various railways connecting it with the towns bordering on the Mississippi and Lake Michigan. Its position in the very heart of the region of Indian mounds and fortifications attracts archæologists from all parts; more copper vessels, fragments of textiles, and other remains of native culture have been brought to light in this district than in any other part of the United States.

Fig. 132.—Fond du Lac and Green Bay.

Scale 1 : 2,220,000.



Fond du Lac ("Lake Head"), which stands at the southern extremity of Lake Winnebago, has preserved its Franco-Canadian name, although the most numerous section of the population next to the Anglo-American are no longer French, but Germans. The district was formerly inhabited by the Winnebagos, the Puants ("Stinkards") of the Canadians, a branch of the Dakota people, who are here separated by intervening Algonquian tribes from the bulk of the nation. Formerly, Fond du Lac, like the neighbouring *Oshkosh*, which lies on both banks of the Fox River a few miles above its mouth in Lake Winnebago, was exclusively engaged in the lumber business, exporting white pine planks, shingles, beams, flat-bottomed boats and wooden houses in sections, to be put together in the regions of the Lakes and Mississippi. But the gradual destruction of the surrounding forests, combined with the increasing facilities of communication, has had the effect of transforming the local industries and giving them

greater variety. Steamers ascend from Green Bay by the Fox River to Lake Winnebago and to Fond du Lac, which is supplied with excellent water by hundreds of artesian wells, tapping a perennial underground reservoir below the city. Farther down the whole valley of the Fox River as far as its mouth in the Baie des Puants, as Green Bay was formerly called, is lined with factories and especially paper-mills; this district is, in fact, one of the chief centres of the paper-manufacturing business in the United States. Fond du Lac forwards a portion of its products directly east through the port of *Sheboygan*, which lies at the mouth of the little Sheboygan River on Lake Michigan.

Ashland, at present the busiest port of Wisconsin on Lake Superior, was so recently as 1880 still an obscure hamlet consisting of a few scattered log-huts almost abandoned amid the surrounding wilderness. Lying at the extremity of a deep inlet in one of the neighbouring forest clearings, far from all trade routes and lines of navigation, it seemed forgotten by the outer world till the attention of speculators was attracted to the spot by the excellence of its iron ores. Thanks to these treasures Ashland became in less than a decade one of the important cities of the north-west, with an extensive network of railway factories, workshops, blast furnaces, depots and jetties. In 1890 the ores exported from this place exceeded 2,000,000 tons. The anchorage of the "Twelve Apostles" (*Apostle Islands*), which lie at the entrance of Ashland Bay, is the safest in these waters. The little archipelago forms a cluster of twenty-seven islets, with a collective area of about 200 square miles. The port of *Superior City*, at the western extremity of the lake from which it is named, does a brisk export trade, especially in flour, cereals and lumber. This place, which was founded by some Southern speculators at the mouth of the Nemadji River, lies at the extreme angle of Wisconsin, over against Duluth, the most important lake port in Minnesota, from which it is distant 7 miles. *Eau Claire* ("Clear Water"), a busy industrial centre in the interior of Wisconsin, is so named from the limpid Eau Claire River which here joins the Chippewa at the head of the navigation. Eau Claire, which owes its prosperity to the motive power derived from the fluvial rapids, forwards the products of its saw-mills and workshops to the Mississippi through the lower Chippewa and Lake Pepin. This basin, about 23 miles long with an extreme breadth of 3 miles, is one of the most picturesque sheets of water in the Mississippi region. Its shores are skirted by precipitous limestone cliffs, rising to a height of 400 feet above the lake, and weathered into the varied outlines of turrets, castles and other fantastic forms.

Below Eau Claire, the largest place in Wisconsin, on the banks of the Mississippi, is *La Crosse*, an old Canadian foundation near the confluence of the La Crosse River. It takes its name from the well-known national game, for the championship of which the local Indian tribes formerly competed in the neighbouring prairie. The original trading-station has now developed into a busy industrial centre, which communicates with the trans-Mississippi states by a railway viaduct here spanning the main stream.

Prairie du Chien, also a Franco-Canadian settlement, lies lower down on the

left bank of the Mississippi, a short distance above the mouth of the Wisconsin. This place, which has never prospered, stands at the lowest level of a low-lying plain, which is encircled by cliffs, and which was formerly the bed of a lacustrine basin or expansion of the Mississippi. Here the two branches of the river are crossed by a bridge formed by two movable pontoons, with a total length of about a mile and a half, including the intermediate island. The Wisconsin, which joins

Fig. 133.—The Devil's Lake, Wisconsin.

the Mississippi three miles below Prairie du Chien, has already completed two-thirds of its course, flowing south and south-east, when it reaches *Portage City* at a point scarce half a mile distant from Fox River, flowing north-east to Green Bay. Here the river, flowing at the bottom of deep gorges, bends abruptly round from south to west, and thus eventually falls into the Mississippi. Nevertheless it is connected for navigation purposes with Lake Michigan by a ship canal constructed across the narrow neck which separates it at Portage City from Fox River. Portage City, which was formerly called *Winnebago Portage*, thus occupies

the unique position of standing at the head of the navigation both of the Mississippi and Laurentian basins at this point. It is reached by steamers from Lake Michigan (Green Bay) through the Fox River and canal, and from the Mississippi through the lower reaches of the Wisconsin. In this western section of its course the Wisconsin encloses in a hilly peninsula the Devil's Lake, an extremely picturesque sheet of water, which like those of the Fox River basin, is dammed up by a rampart of moraines deposited by the ancient glaciers. The lake, which floods a deep rocky chasm one and a half mile long and half a mile wide, is completely isolated without any visible affluent or effluent.

7.—Kentucky.

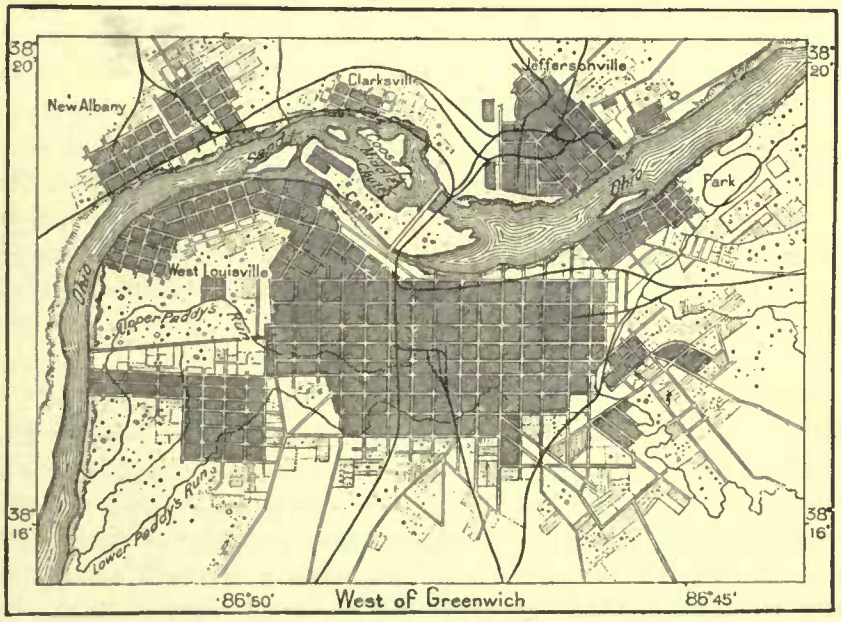
Few of the Federal States are better defined by their geographical position than Kentucky, which has for its northern frontier the north bank of the Ohio, separating it from the three states of the Great Lakes region, Ohio, Indiana, and Illinois. Westwards it is bounded by the Mississippi, separating it from Missouri, while on the east it is skirted by a ridge of the Alleghanies from the course of the Big Sandy River as far as the pass known as Cumberland Gap (1,650 feet). Owing to its great strategic and commercial importance this pass may be regarded as the true centre of the whole of the cis-Mississippi region south of the Ohio. The southern frontier of Kentucky is alone formed by geometrical lines, which east of the Tennessee River coincide nearly with the parallel of 36° 38′ north, and then westwards with that of 36° 30′, both separating it from the state of Tennessee. Kentucky is a region of transition between the Northern and Southern States. Although comprised within the former slave-holding provinces, the great majority of its white inhabitants originally came from the north, and during the Civil War this state supplied to the Federal armies twice as many volunteers as it did to the Confederates. The state is almost entirely comprised within the basin of the Ohio, and in fact owes its name to an affluent of that river. Its generally fertile soil, except in a few places where the porous and cavernous limestone rock is unable to retain the rainwaters, makes it essentially an agricultural region. It produces about a third of all the tobacco grown in the United States, and in the so-called "blue-grass" country (*Poa compressa*) is reared a splendid breed of horses, the finest in America for size, strength, speed, and staying power. Originally a common hunting and battle ground for the northern and southern Indian tribes, Kentucky remained unoccupied by any white people till the year 1774, when the first settlers arrived under Daniel Boone. These were followed by many daring and enterprising immigrants from Virginia and North Carolina, who organised a local government in 1775, giving their new home the name of Transylvania. But next year Virginia proclaimed the whole region first a county, and then a district of the "Old Dominion." But the rising colony energetically resisted this action, and, after much agitation, Kentucky became in 1790 a portion of the new "United States Territory south of the Ohio," being admitted two years later into the Union as at present delimited.

Covington and *Newport*, both facing Cincinnati on the opposite bank of the

Ohio, rank amongst the chief cities of Kentucky; yet their only importance is derived from the share they take in the industrial and commercial movement of their great neighbour. Covington is connected with Newport by a bridge crossing the mouth of the Licking River, and with Cincinnati by several bridges, including a magnificent suspension bridge thrown over the Ohio at an expenditure of $2,000,000. *Lexington*, the chief place in the interior, enjoyed the rank of capital till after the War of Independence, and even still preserves a certain metropolitan aspect in the splendour of its shady avenues and the stately appearance of its public buildings. Here is the seat of the Kentucky University, which was founded in 1858, and which is at present one of the most efficient educational establishments in the South. The famous racecourse, where the fine breed of

Fig. 134.—Louisville.

Scale 1 : 125,000.



horses reared on the surrounding farmsteads display their qualities, is visited by connoisseurs from every part of the United States. Lexington lies on the Elkhorn, a small affluent of the Kentucky River, about 30 miles south-east of *Frankfort*, the present capital. This place stands on the right bank of the Kentucky, which here flows in a deep gorge between steep limestone walls, but which is navigable by steamers both below and above the city.

Frankfort lies 65 miles east of the great city of *Louisville*, which is by far the largest place in Kentucky. It occupies a picturesque position at the falls of the Ohio River, on its left bank, 400 miles above its mouth and 160 miles below Cincinnati. Including its dependencies of *New Albany* and *Jeffersonville*, which have sprung up on the opposite or Indiana side of the river, it had a total population of nearly 200,000 in 1890. Yet this great commercial mart has scarcely a century

of existence. A few pioneers had here entrenched themselves in 1775 and the first log-hut was erected in 1778. The rising village received the name of Falls City, which was soon changed to Louisville in honour of Louis XVI., the ally of the North American republic. The navigable canal, which has had such a large share in its prosperity, dates from the year 1833, and since that time Louisville has doubled its population about every fifteen years. It stands on a plateau 70 feet above the normal water level, with over eight miles of frontage towards the river, which is here crossed by a fine bridge nearly a mile long connecting it with its Indiana suburbs. Below Louisville *Paducah* occupies a favourable geographical position on the Ohio, at the confluence of the Tennessee.

The south-eastern section of Kentucky, till recently little better than a wilderness covered with almost impenetrable woodlands, has somewhat suddenly become the scene of much life and activity, thanks mainly to the construction of highways opening up the coal and iron districts. Some English speculators, without waiting for the spontaneous growth of settlements, have purchased in this region a tract of about 150,000 acres, where they have begun to open mines, build depots and found towns and villages. *Middlesborough*, the industrial capital of the mining country, has been laid out at the very entrance of Cumberland Gap on a plan large enough for a population of 200,000 inhabitants. Factories, hotels, libraries, schools, private residences, a complete municipal organisation, have all been provided in anticipation of its future requirements. Meantime its citizens, numbering little over 1,200, consist mainly of its builders, and the very name of this place is not yet recorded by the latest maps and gazetteers.

8.—Tennessee.

The state of Tennessee forms a long parallelogram disposed in the direction from east to west, and conterminous with Kentucky and Virginia on the north, with North Carolina on the east, Georgia, Alabama, and Mississippi on the south, Arkansas and Missouri on the west. Eastwards it is bounded by the Great Smoky ridge of the Appalachians, westwards by the course of the Mississippi, and is naturally divided into three perfectly distinct physical regions. In the east are the mountains and plateaux of the Alleghanies, which enclose the broad valley of east Tennessee, with its many low parallel ridges trending south-west. Here the head-waters of Tennessee River merge in a single fluvial channel, which, near the southern frontier of the state, begins a vast bend to westward, cutting through the Cumberland plateau in a series of deep gorges, and traversing northern Alabama. At the Mississippi frontier it re-enters Tennessee, and flows northward in a second passage across the state to the Ohio, about 50 miles above its confluence with the Mississippi. The "Big Bend State," as Tennessee is popularly called, is so named from this great curve of its chief river valley. The region comprised within the bend west of Cumberland plateau constitutes middle Tennessee, covered largely by the fertile limestone region of the "Great Basin." West Tennessee borders the Mississippi River, is low and level, and partakes of the character of the Gulf States. A sharp contrast is presented by the highlands and plains, not

only in the general relief of the land, but also in its climate, products, and the character of its inhabitants. In the mountainous districts the people, almost exclusively of white stock, themselves cultivate their lands held in free tenure. In the less elevated western districts, which were formerly cultivated by slave labour, the blacks are numerous and chiefly occupy the position of labourers on large landed estates. These differences between the eastern and western sections of the state had decisive consequences during the Civil War, when the sturdy republican populations of the uplands sympathised with the North and opened to the Federal forces the roads to the South.

Tennessee was long and is still mainly a purely agricultural region; but its vast stores of iron, coal, zinc, copper, and other metals promise as they become more and more developed to transform this state to a second Pennsylvania. Originally a province of North Carolina, it received its first permanent settlers from that colony in the year 1769. These were soon joined by others from Virginia, and the whole region was thus gradually settled almost exclusively by immigrants of Anglo-American descent; hence the foreign element still represents but a mere fraction of the white population. In 1776 Tennessee was officially named the District of Washington, but some ten years later the inhabitants organised a separate administrative state, to which they gave the name of "Franklin." This state, however, was but short-lived, and in 1789 was comprised in the "United States Territory south of the Ohio." Fifteen years later Tennessee was detached as a separate territory from this division, and finally in 1796 admitted as a state to the Union with its present limits.

Nashville, the present capital, occupies a central position on the Cumberland River, which is navigable to this point, nearly 200 miles above its confluence with the Ohio. Since the Civil War numerous settlers have been attracted to the district, and Nashville is now the first city in the state for population, trade, industry and educational advantages. A limestone of excellent quality, resembling marble in appearance and mined in the district, has supplied the material for the capitol, a stately edifice crowning an eminence nearly 200 feet high, and erected at a cost of $1,500,000. Many of the other public buildings, and even private residences, are built on a corresponding scale of splendour and magnitude. Here is the seat of the Nashville University, dating from 1806, of the Vanderbilt University (Methodist Episcopal), and of the Fisk University, founded in 1867 as a training school for coloured teachers. Nashville is connected with *Edgefield* on the opposite bank by a suspension bridge and a railway drawbridge. *Knoxville*, the former capital, and still the metropolis of East Tennessee, is finely situated on an elevated terrace on the right bank of the Holston River, 180 miles east of Nashville. The Holston, one of the main branches of the Tennessee, is joined by the French Broad three miles below the city, and is navigable by steamers to this point. Knoxville has some glass-works and other industries connected with the neighbouring mines. It is the seat of the East Tennessee University, associated with which is the Tennessee Agricultural College.

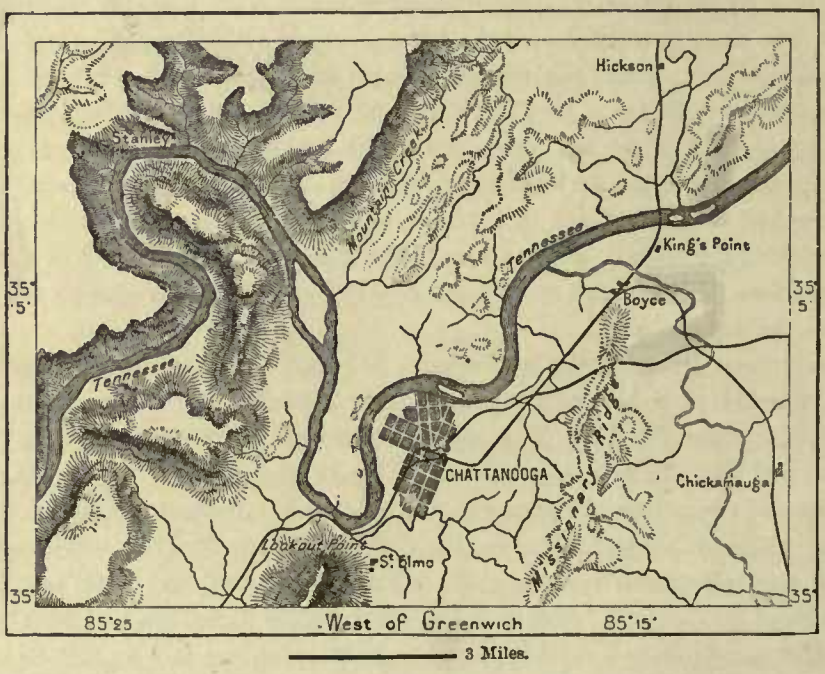
Chattanooga, in Cherokee the "Raven's Nest," occupies a secluded spot encircled

by hills, on the left bank of the Tennessee 150 miles south-east of Nashville. The limestone rocks, whose vertical walls and wooded slopes seem at first sight to enclose the city on all sides, are nevertheless here and there pierced by broad gaps, while the Tennessee, which passes to the west and develops the great "Mocassin bend," finds an issue through the hills south-westwards to the state of Alabama.

The rising town, which stands at the northern base of Lookout Mountain, suddenly became famous in the year 1863. The "Gate of the South," as it has been called, occupies a strategic position of vital importance at the issue of the upper Tennessee valley, and at the head of the easy passes giving access to Georgia by turning the extreme escarpments of the Appalachians. Hence the Confederates had occupied all the approaches, crowning the surrounding heights

Fig. 135.—Chattanooga.

Scale 1 : 225,000.



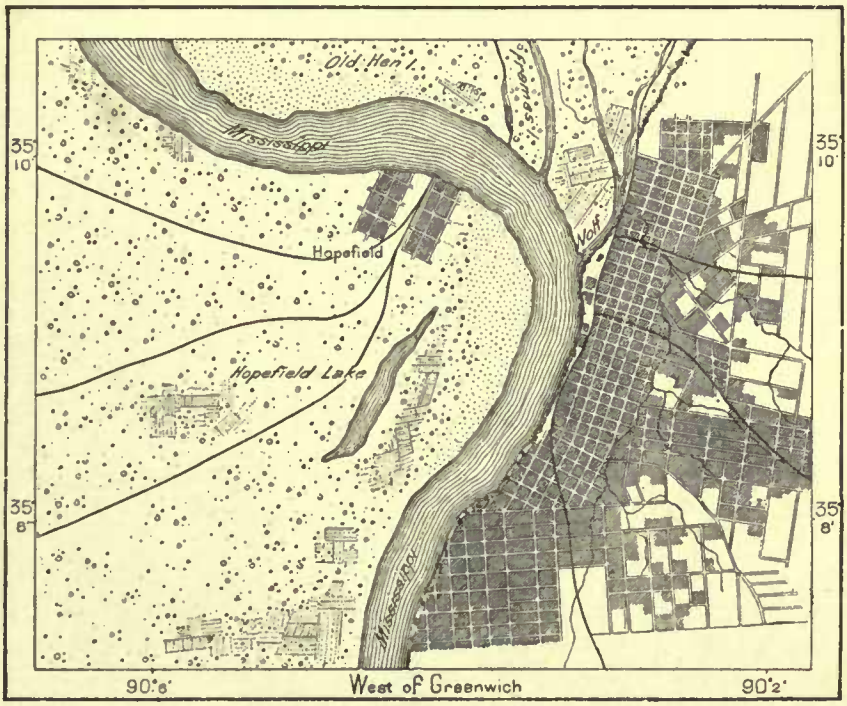
with their fortified lines. But after a series of sanguinary conflicts in the valley of the Chickamauga, a little affluent of the Tennessee, and right up to the summit of Missionary Ridge, to the east of the city, General Sherman succeeded in forcing the "Gate." Struck by the beauty of the country and its rich stores of coal and iron, many of the Northern troops who had fought at Chattanooga afterwards settled in the district, and were soon followed by thousands of their fellow-countrymen. Thus it happened that the little rural borough was transformed to a busy industrial and commercial centre. Chattanooga is now connected with Saint Louis by a regular service of steamers plying on the Tennessee, the Ohio and Mississippi. Formerly the navigation at the emergence of the stream from the Cumberland plateau in the northern part of Alabama was interrupted by the so-called Muscle Shoals. These reefs obstructed the current for a distance of

about 14 miles, dividing it into numerous narrow and shallow channels which a child might easily wade across. The construction of a canal in this broad rocky bed would have been both difficult and costly. Hence this work was executed on the bank of the Tennessee and completed by a railway on which the locomotive acts as a tug, taking in tow long convoys of barges.

Along the Mississippi River the only large city in the state is *Memphis*, which is admirably situated just below the Wolf River confluence on the fourth Chickasaw bluff 420 miles below Saint Louis. This great port of entry, which presents an imposing aspect seen from the river, and which was till recently the most

Fig. 136.—Memphis.

Scale 1 : 75,000.



important city in the state, is still a prosperous and growing commercial city. The great river is spanned here, for the last time before it reaches the sea, by a colossal iron railroad bridge.

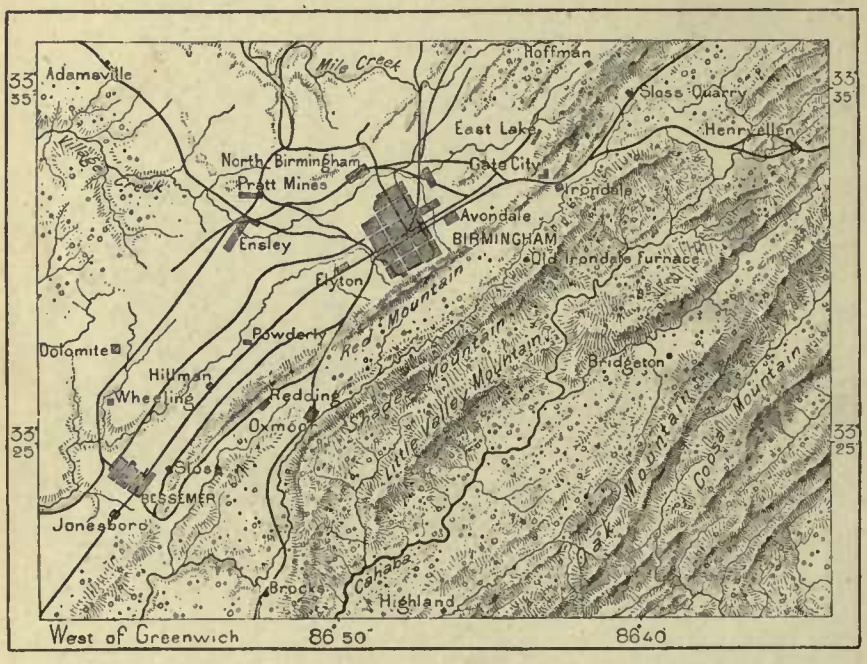
9.—Alabama.

The state of Alabama, which comprises the greater part of the basin of the river whence it takes its name, has been strangely delimited. In the north its boundary was made to coincide with the 35° of latitude, so that the middle course of the Tennessee River was cut off from the state bearing its name. Westwards the frontier towards Mississippi is formed by two straight lines, neither of which coincides with the meridian. On the east side also an oblique line runs between Alabama and Georgia as far as the Chattahoochee River. Lastly, towards the south

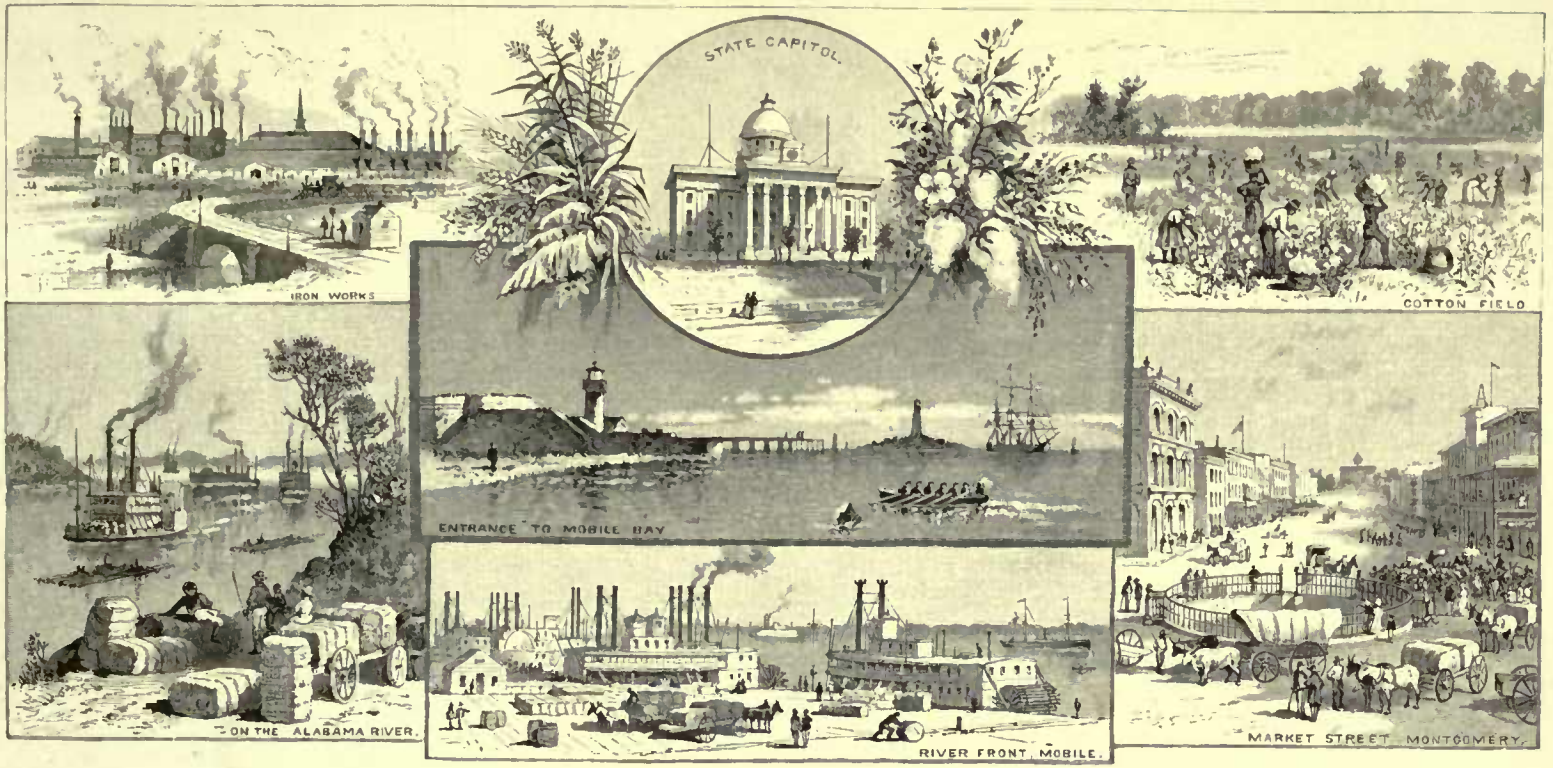
a portion of the seaboard was assigned to Florida, so that the sea front of Alabama is confined to the district about Mobile Bay. The state is divided into two distinct physical sections—the region of the Appalachian foothills, which fall from terrace to terrace towards the south-west across the intervening parallel valleys of the Alabama affluents, and the region of low-lying plains, which towards the south for the most part assume a swampy character. Under the slave system the state was almost exclusively occupied with agriculture, and especially with cotton-growing, carried to such an extent that the exhaustion of the soil compelled the planters to allow vast tracts to lie fallow. The extensive coal and iron deposits, which are widely distributed throughout the north-eastern and central districts, although

Fig. 137.—Birmingham and its Mineral Region.

Scale 1 : 400,000.



their existence was well known, were very little worked. It was not till recent times that by the development of the mining industries these regions became connected with the manufacturing districts of the Alleghany states. The population, of which nearly one-half is coloured, increases at a lower rate than the normal growth of the whole Union. In this region the first settlers were the French, who occupied the Mobile Bay district at the beginning of the eighteenth century, and founded the station of Mobile in 1711. Later, this district passed to Spain and became a part of West Florida, which was purchased by the Federal Government in 1819. But most of the present Alabama, as well as Mississippi, was considered as forming part of Georgia until the whole region was detached from that state in 1812, and Alabama separated five years later from Mississippi, and in 1819 incorporated in the Union as a state with its present limits. During the



VIEWS IN ALABAMA.

Civil War Alabama seceded, a provisional government being organised at Montgomery, which for a time became the capital of the Confederacy.

In the interior of Alabama the largest and busiest place is *Birmingham*, with its cluster of industrial dependencies. Yet till quite recent years this place seemed to hold out little hope of realising the expectations of its founders, who named it by anticipation after the great metallurgic centre of the home country. Once, however, that its extraordinary advantages for the production of cheap cast-iron came to be recognised, Birmingham entered on a career of prosperity almost unheard of even in the United States. Houses, hotels, workshops, parks, all sprang up as if by enchantment, and an obscure village suddenly developed into a large and flourishing city. In 1890 the output of coal in the neighbouring district exceeded 7,000,000 tons, while the production of iron amounted to 800,000 tons, or nearly one-half of the quantity produced in the whole of Alabama. Birmingham lies at the western foot of the Red Mountain ridge of the southern Appalachians at the point of intersection of two important lines of railway 95 miles north-west of Montgomery, and 140 miles south-west of Chattanooga. *Florence*, another rising place, stands at the north-western corner of the state near the right bank of the Tennessee, just below the lateral canal constructed to turn the Muscle Shoals rapids.

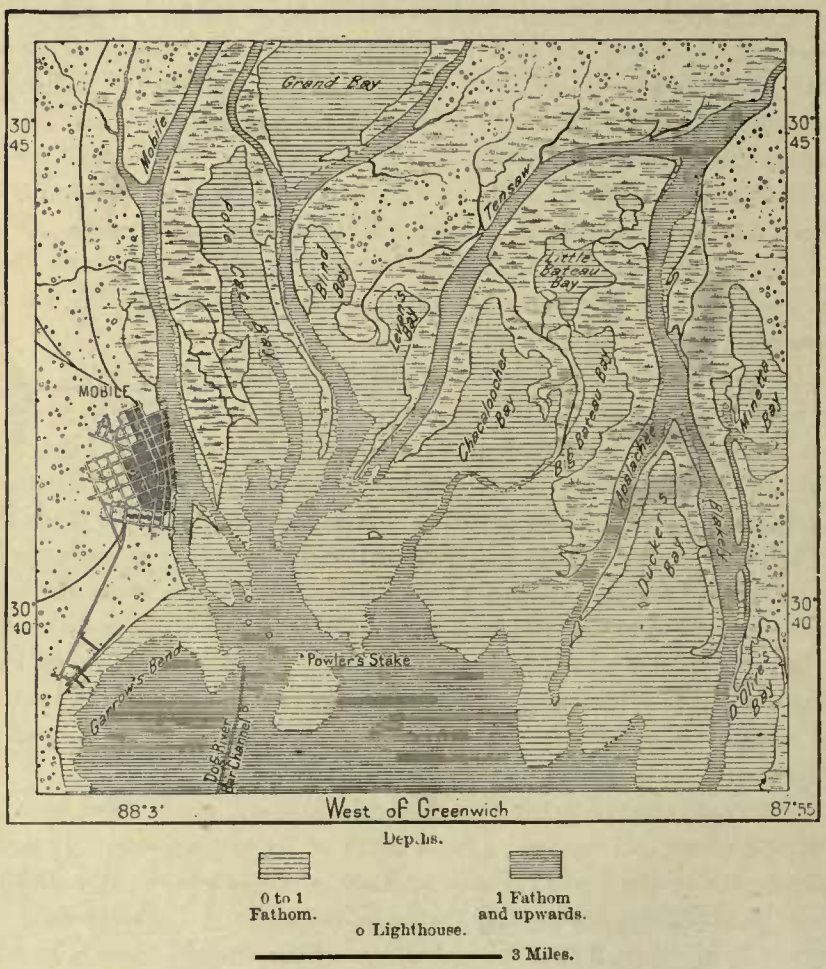
Montgomery, capital of Alabama, occupies the geometrical centre of the state, standing on the left bank of the Alabama 400 miles above Mobile, and a short distance below the Coosa and Tallapoosa confluence. Steamers ascend in all seasons as far as the foot of the terrace on which the city has been built. Montgomery is not an old settlement, its foundation dating only from the year 1792. At the beginning of the Civil War it received the ephemeral title of capital of the Confederate States, an honour which brought it nothing but disasters. At Montgomery the Alabama trends sharply round to the west, and flows in this direction for a distance of 50 miles. At the point where it again turns abruptly round to the south, its elevated right bank is occupied by the busy riverine port of Selma, 160 miles by land north-east of Mobile. Large steamers ascend as far as this place, where they ship considerable quantities of cotton, the chief article of export.

Mobile, formerly known to the French as "La Mobile," was founded by Bienville in 1702, and afterwards removed a little north of its original site. It continued to be the capital of the French colony of Louisiana down to the year 1723, when the centre of administration was transferred to New Orleans, 165 miles farther west. Afterwards Mobile passed into the possession of the Spanish Crown, by which it was ceded to the United States in 1819. Its low houses are grouped near the north-west angle of Mobile Bay, below the network of bayous where are intermingled the waters of the Tombigbee and Alabama, whose junction forms the Mobile River as it is commonly called. These half-submerged lands and intervening fluvial channels are crossed by a system of wooden viaducts with a total length of 15 miles, the longest series of similar structures in the United States.

The business parts of the city, which is a port of entry, are compactly built, whereas the residential quarters are scattered over a large space amid the sur-

rounding orange-groves. Mobile has several cotton-mills, foundries, and tobacco factories, and is the centre of a large export trade in cotton and spring fruits and vegetables. But its chief business relations are with its neighbour, the metropolis of Louisiana, the communications being maintained by means of steamers of light draught which pass through Lakes Borgne and Pontchartrain. In 1890 nearly 1,000 vessels, with a collective burden of over 500,000 tons, were engaged in the foreign and coasting trade of Mobile and the neighbouring little port

Fig. 138.—Mobile.
Scale 1 : 145,000.



at the mouth of the Pearl River on the frontier of the states of Alabama and Louisiana. The bar at the entrance of Mobile Bay has a depth of scarcely more than two fathoms, while the Pearl River reaches the sea precisely at the spot where the marine inlet known as Lake Borgne is separated by a spongy forest-clad tract from Lake Pontchartrain. All these flat watery plains would thus seem to be an alluvial delta created by the Pearl River. Their form is continually changing, and the channel through which the overflow of Lake Pontchartrain is carried seawards has frequently shifted its bed.

10.—Mississippi.

The State of Mississippi presents somewhat the same outlines as its eastern neighbour, Alabama. Like that state it has its main axis disposed in the direction from north to south, and as a whole it affects the form of a long quadrilateral, reaching the sea only along the eastern section of its southern frontier. Westwards it is separated from the Gulf of Mexico by an intruding portion of Louisiana, while along its western border it has for its frontier the course of the Mississippi

Fig. 139.—Cotton: the Plant, the Bloom, the Boll.—Picking, Ginning, Pressing.

River, separating it from Arkansas in the north and Louisiana in the south. Conventional straight lines form the northern and eastern boundaries towards Tennessee and Alabama respectively. Being parcelled out in vast domains, which till recently were cultivated by slave labour, Mississippi was the "Cotton State" in a pre-eminent sense, and cotton still constitutes its chief crop. No other region in the United States yields better returns for the ordinary qualities of the fibre than the bottom-lands of the Mississippi and its affluent the Yazoo. These vast alluvial tracts, which have an average breadth of about 50 miles, are

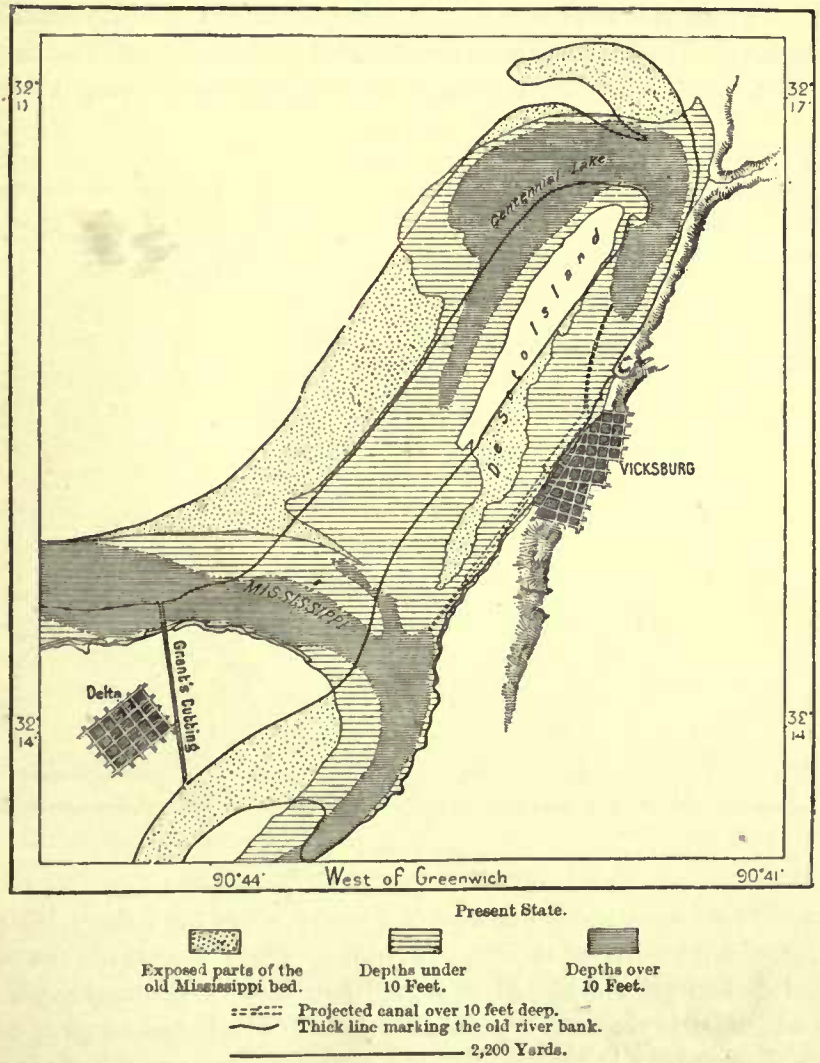
dominated eastwards by rolling plateaux of limestone formation covered in the southern districts by pine forests. Here is developed the great level pine region, known also as the "cow country," which affords good natural pasturage, besides an abundance of yellow pine timber, resin, tar and other naval stores. During the Civil War the planters grew wheat on the lighter soil of the eastern grassy plains, and crops were thus raised to supply the Confederate troops. Despite the advantages of its soil and climate, Mississippi, being too exclusively occupied with one agricultural product, has remained one of the least developed and least wealthy states of the Union, and with the exception of Vicksburg, Meridian, and Natchez, its few cities are little more than rural boroughs. Since the abolition of slavery the great landed estates have been largely broken up, and in 1880 the average size of the farms scarcely exceeded 180 acres.

The state was visited by De Soto in 1541, and by La Salle in 1682; but the first permanent station was that of Natchez, founded by Iberville in 1716. In 1763 this part of French Louisiana was ceded to England, and constituted a part of West Florida; but the northern division was claimed as part of Georgia, while in 1783 the southern districts were incorporated in the Spanish colony of West Florida. Although Spain continued to claim the whole region until it was finally ceded to the United States in 1819, Mississippi was organised as a territory in 1798, and even admitted as a state to the Union with its present limits in 1817. The so-called "Yazoo Fraud," a sale of this and other western tracts by Georgia in 1795, was the cause of much excitement and angry feeling for many years, until a large sum of money was appropriated by the Federal Congress to pay unsatisfied claims and close litigation in 1814. In 1838 the state itself caused more financial troubles by creating a debt of $7,000,000, the whole of which was soon after repudiated. During the Civil War, Mississippi suffered great losses, followed by a long period of misrule and anarchy, from the effects of which she has scarcely yet recovered.

In the eastern part of the state the chief place is *Meridian*, which occupies the crest of the waterparting between the Tombigbee and the sources of the Chickasahay, one of the main branches of the Pascagoula. *Jackson*, the capital, lies nearly 100 miles farther west, near the centre of the state, at the intersection of two main lines of railway, and on the right bank of the Pearl River. But the most populous place in the state is still the city of *Vicksburg*, the *Nogales*, or "Walnuts," of the Spaniards, which crowns a steep bluff on the left bank of the Mississippi about 60 miles south of *Greenville*. The foot of the cliff is pierced by artificial caves where the civilians lived during the memorable siege of the city in 1863, and here the river till recently described a great bend in the low-lying plain encircling a long wooded peninsula. From a point opposite Vicksburg, on the right bank, a railroad runs to Shreveport, in connection with the lines on the east side of the Mississippi. At that time Vicksburg, which lies near the Yazoo confluence, was the most frequented riverine port between Memphis and New Orleans. During the Civil War it also became one of the strongest citadels of the Confederacy. The Federals held the

upper reaches of the river as far south as Tennessee and Arkansas, and in the spring of the year 1861 they had also occupied New Orleans and the lower course of the Mississippi as far as a point below Port Hudson and Louisiana. But the citadel of Vicksburg still held out, and until it was captured it was impossible to complete the blockade of the Confederate States by land, sea, and river. The besieging forces had cut a trench across the alluvial plain at the root of the

Fig. 140.—Vicksburg and Shiftings of the Mississippi.
Scale 1 : 65,000.



peninsula formed by the sharp windings of the river at this point. But the tenacious clayey subsoil resisted the scouring action of the currents, so that the crews of the Federal flotilla were thwarted in their hopes of being able to ascend and descend the Mississippi by turning the Vicksburg batteries. Hence the necessity of laying formal siege to this stronghold, which, after costing the Northern army 16,600 men, at last surrendered on July 3, 1863, the very day

which witnessed the failure of the last general attack of the Confederates in Pennsylvania. A few weeks afterwards Port Hudson also fell, and the Mississippi became once more free from its mouth to its sources. After these stirring events the prospects of Vicksburg were affected by an important change in the local topography. Subsequently to one of the periodical inundations, the Mississippi abandoned the bed which it had hitherto followed at the foot of the bluffs on which the city stands, and began to flow through a fresh channel near the trench by which the Federal army had in vain endeavoured to deflect its course. At present it flows some miles farther south, so that the communications between the river and its port can be maintained only by constant dredging.

Natchez, which occupies a bluff some 200 feet high on the same side and in

Fig. 141.—Natchez.
Scale 1 : 460,000.

a somewhat analogous position to that of Vicksburg, but 130 miles farther down, is, like it, also a busy riverine port. This place, which perpetuates the name of the local Indian tribe described in idyllic language by Chateaubriand, is the oldest settlement in the state. During the period of their first essays at colonisation, the French built in 1716 the fortified station of *Rosalie* on the site at present occupied by the city. But the new arrivals failed to maintain friendly relations with the native populations, and the Natchez were fain to seek refuge with their northern neighbours, the Chickasaws. But even so they could not escape the pursuit of Périer, Governor of Louisiana, who took them by surprise in 1730. Most of the fugitives were massacred, and the survivors—amongst others, the royal family of the "Sun"—were carried away into slavery. After its annexation

to the United States, Natchez soon became the chief place in the middle Mississippi valley, but since then it has lost much of its relative importance. Despite its favourable position for trade, it has fallen into decay, and for the last two decades its population has remained almost stationary. Nevertheless, much cotton is still shipped at "Natchez under the Hill," as the low-lying business quarter is called. On the steep hill itself, which is approached by a track cut in the hard reddish conglomerate, broad, shady avenues, crossing each other at right angles, are lined by small houses and villas, mostly embowered in foliage or festooned with flowering creepers. Here travellers from the north meet the first orange-groves characteristic of the extreme south. From the summit of the bluff an extensive prospect is commanded of the vast pine-clad marshy plains of Louisiana.

11.—Minnesota.

Amongst the trans-Mississippi states, Minnesota, so called from one of its chief rivers, occupies very nearly the geometrical centre of the North American continent. It also lies in the geographical centre, for the Mississippi and Red River of the North have both their sources within its borders on the Height of Land, whence they flow in opposite directions to two different marine basins. Northwards Minnesota is conterminous with the Dominion of Canada, from which it is separated partly by the conventional line of 49° north latitude, partly by the Lake of the Woods, and an almost continuous chain of other lakes, extending to the north side of Lake Superior. On the east side the Saint Croix and the Mississippi form the dividing line towards Wisconsin, as the Red River of the North does on the west side towards North Dakota; lastly, on the south-west and south geometrical lines form the frontiers towards South Dakota and Iowa. Lying within the cold northern zone, Minnesota long remained unoccupied by white settlers. In 1805 the first parcel of land was purchased by the Federal Government from the aborigines; but no stations were founded till the year 1819, when Fort Snelling was erected at the Mississippi-Minnesota confluence. In 1822 a mill was built on the spot which is at present occupied by the great city of Minneapolis, and the general settlement of the country advanced at such a slow rate that the regular postal service was not introduced till 1832. Even so late as the middle of the century, less than 2,000 acres of land had been brought under cultivation. But about that time the stream of migration began to be directed towards the Upper Mississippi basin, and by the year 1860 the reclaimed land already comprised a collective area of nearly 500,000 acres. Since then the state has continued steadily to progress, and, most of the land having already been occupied, a northern reserve belonging to the Ojibway (Chippeway) Indians had to be purchased to make room for the inflow of white settlers.

Being covered throughout nearly its whole extent by glacial drift, Minnesota is specially suited for the cultivation of cereals, fruit-trees and vegetables. Apples and strawberries are amongst its staple products, while as a wheat-growing region it is surpassed by no other state in the Union. Spring wheat especially arrives at great perfection, and commands the highest prices in the home and foreign

markets. Potatoes also, as well as oats, barley, hops, and flax, thrive well, while the pastures afford excellent fodder for large herds of cattle and horses. The north-eastern section about Lake Superior abounds in iron ores and other metals; but towards the Canadian frontier the rugged hilly country, strewn with swamps and lacustrine depressions, is of a less productive character, though even here there is an inexhaustible store of peat. In these northern districts, comprising about a third of the whole territory, the white population is still very thinly scattered over the surface; hence here have been formed the enclaves, or reserves, to which the surviving Indian tribes are now confined.

The section of Minnesota lying east of the Mississippi always formed part of the United States dominion. Comprised originally in the ill-defined North-west Territory, it passed in succession to the territories of Indiana, Illinois, Michigan, Wisconsin, and Minnesota. The western section beyond the Mississippi, on the other hand, was supposed to be included in the still more vaguely defined region of French Louisiana, and thus came into the possession of the Federal Government by the purchase of that domain from the Emperor Napoleon I. in 1803. But Minnesota was not formally occupied by the United States till about the year 1819, and some of the northern districts were even settled by English colonists from Canada in the belief that they formed part of British North America; hence the foundation of Lord Selkirk's colony of Pembina in the extreme north-west. Other districts were for a time included in the neighbouring state of Iowa. In fact, Minnesota was not organised as a territory till the year 1849, when it embraced a region nearly twice its present area. Even when Minnesota was admitted to the Union as a state with its present limits, all the western parts continued to be administered as Minnesota Territory till the year 1861, when they were absorbed in the newly-constituted Territory of Dakota.

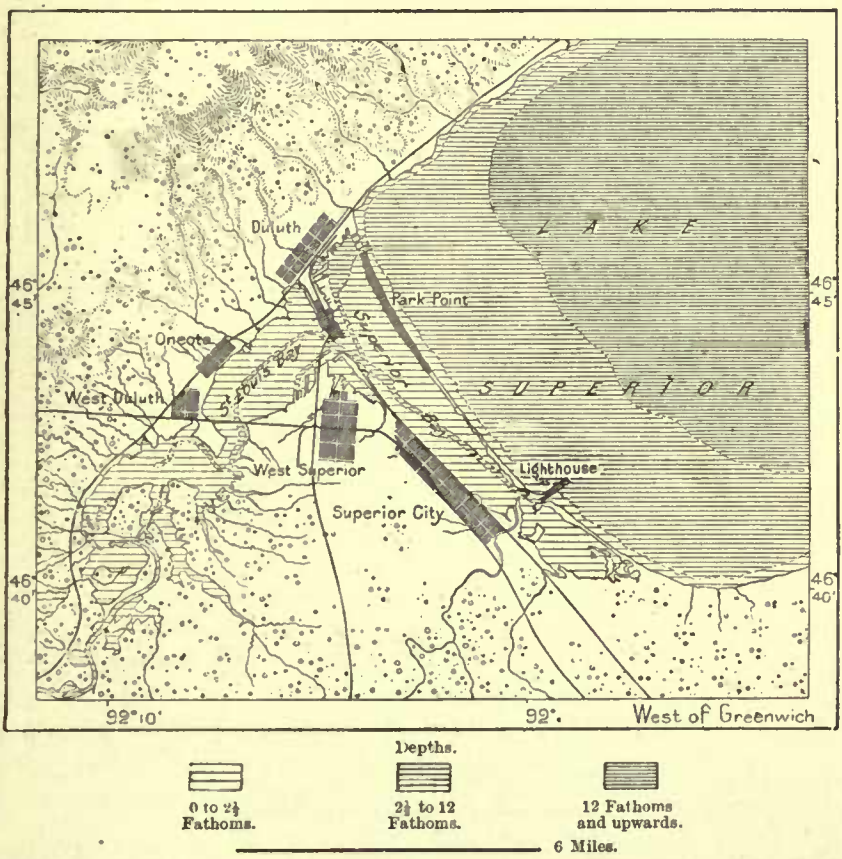
Duluth, the port of entry of Minnesota, at the extreme west end of Lake Superior, is so named in honour of the French explorer, Greysolon de Luth, who first visited this region in 1678, and succeeded in rescuing the Recollect missionary Hennepin, at that time a prisoner in the hands of the Sioux. Founded in the midst of solitudes on a low-lying beach between the lake and the neighbouring hills, Duluth made little progress till the opening of the railways, which by connecting its port with the cities of the upper Mississippi and their boundless wheat-growing plains, soon transformed it to an emporium of the first rank. Duluth occupies a unique position in the very heart of the continent, at the head of the navigation in the vast basin of the Great Lakes and Saint Lawrence, about 2,500 miles from the Atlantic. The great inland waterway thus commanded by this city flows due east in the direction of Great Britain and West Europe, with their teeming populations and immense commercial and industrial centres. Recently a vessel of the new "whale-back" type, built at Superior City, sailed directly from Lake Superior to England with a cargo of grain. The western extremity of the lake is separated only by a distance of scarcely 120 miles from another vital point in the vast system of trade routes spread over the Union, the point where begins the navigable highway of the Mississippi, with all its great

SCENERY IN MINNESOTA.

affluents ramifying in every direction throughout this immense fluvial basin. Duluth is consequently one of the natural centres in the economic life of the North American continent, and its importance in this respect has been more than doubled by one of the Pacific trunk lines which has its western terminus at Tacoma on the shores of Puget Sound. This converging point of three main continental highways has made rapid progress in recent years. Workshops and houses have sprung up in hundreds and thousands along the shores of the lake, and the neighbouring Superior City, although situated within the Wisconsin

Fig. 142.—Duluth and Superior City.

Scale 1 : 250,000.



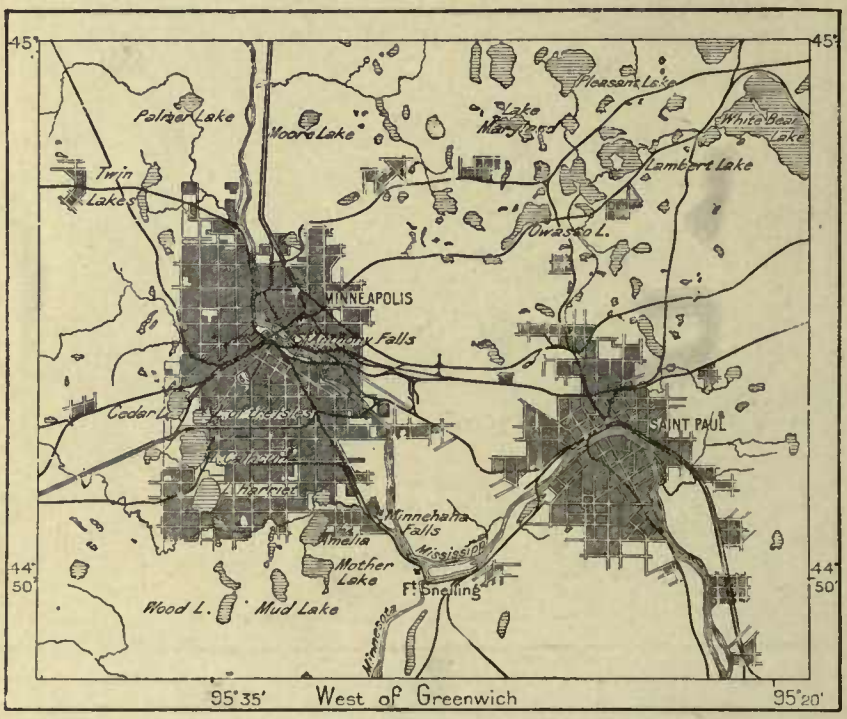
frontier, has already become a mere suburb of the Minnesota "seaport," as it may be called. *Fergus Falls*, *Breckenridge*, and *Moorhead*, the chief places on the plain traversed by the upper Red River, rank merely as post villages, though Breckenridge possesses some importance from its position at the head of navigation of the main stream. In the interior of the state no towns properly so called occur anywhere except along the banks of the upper Mississippi. Here *Brainard*, *Little Falls*, and *Saint Cloud* follow in the direction from north to south, the last-mentioned partly inhabited by Franco-Canadians.

Minneapolis, which stands lower down on the right bank of the river, a short

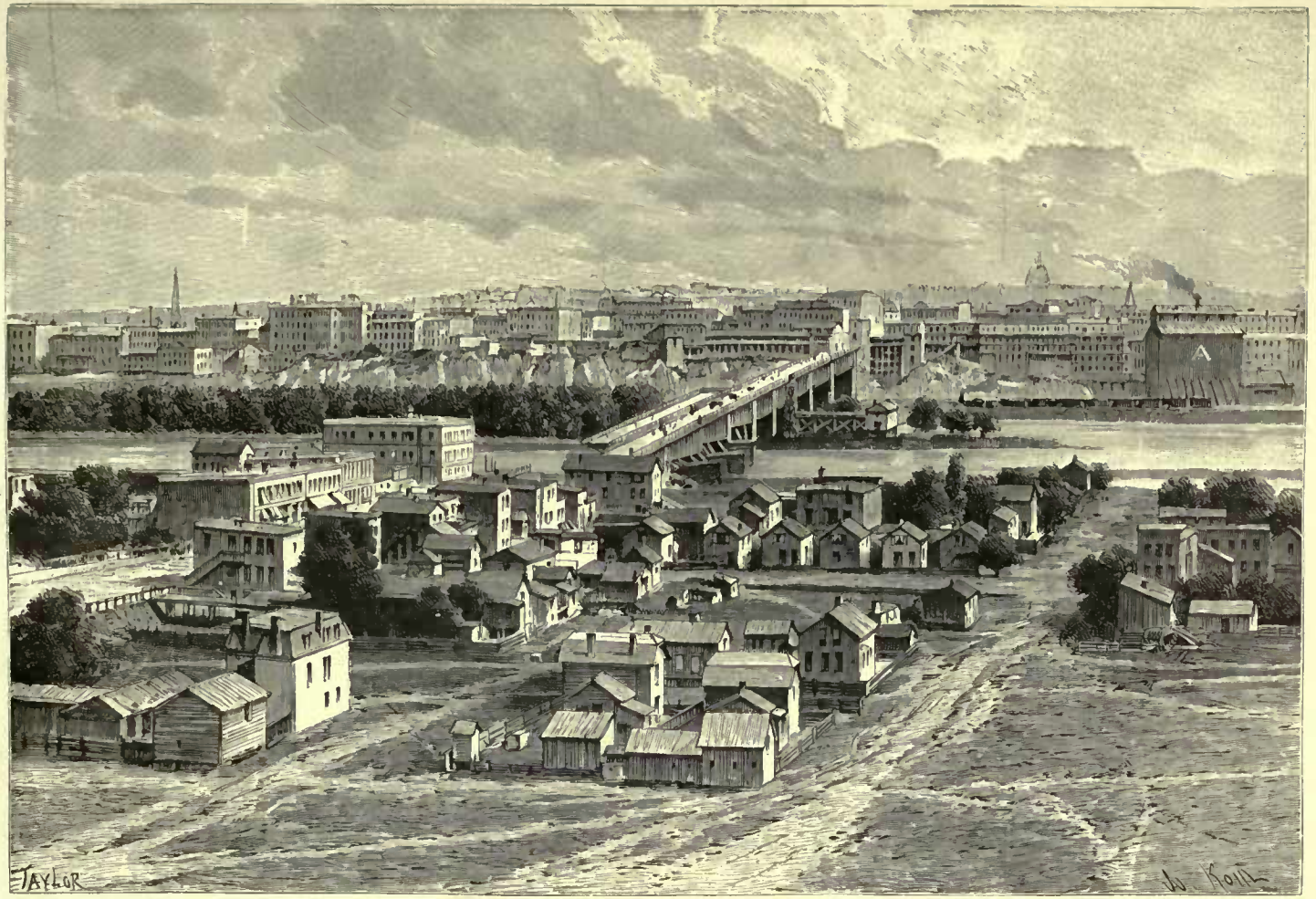
distance above the Minnesota confluence, is the first important place on the upper Mississippi. From the Saint Anthony Falls it derives an enormous motive power estimated at over 50,000 horse-power, which is utilised by numerous workshops, flour-mills, and various other industries. Minnesota is connected by several bridges with its suburb of *Saint Anthony* ("Saint Anthony of Padua") on the opposite side, which is the oldest settlement in the country. The two granite islands of *Hennepin* and *Nicollet* recall the visits of the first explorers of the upper Mississippi. The barbarous name of the city itself, partly Indian, partly Greek, is said to mean "Water Town," a name certainly justified by the fact that Minneapolis owes its existence to the rapids closing the navigation at this point. But

Fig. 143.—Minneapolis and Saint Paul.

Scale 1 : 265,000.



according to other etymologists, this word is an abbreviated form of "Minnehahapolis," that is, the "City of the Laughing Waters," in reference to a neighbouring cascade sung by American poets. Here is the Minnesota University, founded in 1868 on liberal principles, and open to students of both sexes. Minneapolis and Saint Anthony are increasing so rapidly that they must sooner or later reach all the way to *Saint Paul*, which, following the windings of the river, is some 24 miles distant, but not more than eight miles from centre to centre by the direct railway route. Saint Paul, capital of the state, and rival of Minneapolis in population and enterprising spirit, is already an ancient city compared with most other places in the north-west. Yet it dates only from



GENERAL VIEW OF SAINT PAUL.

about the year 1838, a time when the Franco-Canadian, Parent, known as *l'Œil de Cochon*, occupied a neighbouring log-hut.

Such has been the progress of Saint Paul and Minneapolis that, within a single generation, these twin cities have, collectively, rivalled in population the great riverine ports of the Ohio, Cincinnati and Louisville, and even New Orleans, metropolis of the lower Mississippi; collectively they are but little inferior to Saint Louis itself. In the division of labour Minneapolis is more especially engaged with the industries, while Saint Paul chiefly represents the commercial movement. Standing at the head of navigation on the Mississippi, it serves as the forwarding depot for the produce of the upper fluvial basin and of the Saint Croix, which flows from the watershed near Lake Superior. Through the port of Duluth, Saint Paul also communicates directly with the whole of Canada, the Eastern States of the Union, and Europe. In 1889, the riverine craft owned in this place comprised nearly a hundred steamers, besides numerous barges and flat-bottomed vessels. Saint Paul already covers a space on both sides of the river little inferior to that of Paris, and one of the neighbouring lakes yields a daily supply of 7,000 000 cubic feet of excellent water. An inclined bridge 1,730 feet long affords access from the upper quarters of the city to the suburb of *West Saint Paul*, on the low-lying south bank of the Mississippi. It has been proposed to merge all these urban groups in a single municipality under the name of "Minnepaul," a term formed by combining together some of the elements of the two chief places. *Fort Snelling*, the oldest American settlement in the state, lies on the right or south bank about midway between these two cities. The original intention was to group the metropolis of the upper Mississippi basin round about this station, and although the place was afterwards abandoned by its neighbours, spontaneous effect will, nevertheless, ultimately be given to this intention, for with the continual growth of these urban groups the fort must become the natural centre of the whole aggregate.

Below Saint Paul several busy fluvial ports follow along the banks of the Mississippi. Such are *Hastings*, near the confluence of the Saint Croix, 20 miles by rail from Saint Paul; *Red Wing*, near the northern extremity of Lake Pepin, a great market for wheat; *Wabasha*, two miles below the same lake, and near a spring of extremely efficacious medicinal waters; *Winona*, about 180 miles below Saint Paul, one of the most important markets in the United States for cereals and sawn timber. *Stillwater*, on the Saint Croix River, above the lake of the same name, has also a large timber industry, and forwards the timber brought down from the shores of Lake Superior in the northern part of the state.

12, 13.—The Two Dakotas.

Dakota, land of the Sioux, or Da Kota, that is "Allied," who formerly roamed the country in pursuit of the bison and elk, stretches over a vast extent of territory comprised between the Canadian frontier in the north and the Niobrara River separating it from Nebraska in the south. It thus stretches across six degrees of

latitude, 43°—49° N., with a total length of about 450 miles, and a breadth of 350 miles between Minnesota and Iowa on the east and Montana and Wyoming on its western frontier. But this immense domain, some 30,000 square miles larger than the whole of Great Britain and Ireland, has recently been divided into two states, North Dakota and South Dakota, nearly equal in size, and both forming elongated quadrilaterals disposed in the direction from east to west.

Dakota passed in 1803 from France to the United States, as part of the great Louisiana purchase. But it long remained unorganised and even unoccupied by any white settlers. In 1849 it was included in the Minnesota Territory, from which a portion was afterwards detached and joined to Nebraska till the year 1864. In 1861 Dakota was for the first time organised as a territory, and at that time comprised the whole of Montana, besides parts of Wyoming and Idaho, but was reduced in 1868 to the limits of the region which at present coincides with the two States of North Dakota and South Dakota. These states, formed by dividing the territory into two nearly equal parts, were organised and admitted into the Union with the present limits in the year 1891.

North Dakota has no natural frontiers, except towards the east, where the course of the Red River separates it from Minnesota. In the north-western part of the state the Missouri River describes a great bend along the foot of the arid and stony plateau of the "Grand Coteau du Missouri." The two fluvial valleys, as well as those of their numerous effluents, present vast stretches of land suited for the cultivation of cereals; hence these districts have begun to attract agricultural settlers in large numbers, especially since the year 1877. But they are unfortunately subject to long periods of drought, while the badly watered parts are adapted only for stock-breeding.

A few reserved tracts have been set apart to serve as the collective domains of various tribes detached from the bulk of the Dakota nation. But the Fort Berthold Reserve, largest of these enclaves, situated on the Grand Coteau du Missouri, in the north-western part of the state, was broken up and thrown open to colonisation in 1891, and at once invaded by white settlers in large numbers.

Along the left bank of the Red River of the North several small towns have already sprung up over against corresponding settlements on the Minnesota side. Of these riverine towns *Wahpeton*, *Fargo*, and *Grand Forks* are the most important. The older settlement of *Pembina* occupies an advantageous position near the confluence of the Pembina and Red River, at the very point where the main stream passes from United States territory into the Dominion of Canada. Pembina is thus an important custom-house station on the common frontier, where nearly all the traffic converges from Manitoba and the upper Mississippi region.

Although the most thickly peopled zone lies on the eastern frontier towards Minnesota, the site chosen for the new capital is situated much farther west towards the centre of the state and on the left bank of the Missouri. The city has received the name of *Bismarck* from its German, Scandinavian, and Anglo-American inhabitants, who already number over 5,000 souls. The village of *Mandan*, on the opposite bank, perpetuates the name of the now almost extinct Indian tribe,

who were distinguished amongst all the surrounding native populations by their lighter complexions, more refined habits, and some remarkable social usages.

South Dakota is traversed throughout its entire extent from north to south by the course of the Missouri, and also watered by several other streams, one of which bears the name of the state. The Dakota, which joins the Missouri about 10 miles below Yankton after an estimated course of some 600 miles, was the *Rivière à Jacques* of the Franco-Canadian voyageurs, whence its alternative English name of the James River. In its western section South Dakota has been quite as arbitrarily carved out as its northern neighbour. There are in fact no natural frontiers except in the north-east, where Lake Traverse and Big Stone Lake separate it from the state of Minnesota, and in the south-east where the Big Sioux River forms the dividing-line towards Iowa, and where the Niobrara and middle Missouri separate it from Nebraska. Westwards the 104th meridian, forming the common frontier with Montana and Wyoming, traverses the Black Hills, and intersects the north and south forks of the Cheyenne (Shyenne) affluent of the Missouri. This section of the territory, though apparently unsuitable for agricultural settlements, abounds in mineral resources. Both gold and silver are found in the Black Hills, and salt, tin, and petroleum also occur, besides lignite and coal, both, however, of inferior quality. Coal abounds especially in the cretaceous formations surrounding the Potsdam sandstones and other azoic and eozoic rocks of which the Black Hills mainly consist.

Till recently nearly all the western half of South Dakota was reserved for the Sioux Indians. Apart from the small triangular district of the Black Hills, with its gold-mines comprised between the two forks of the Cheyenne, these aborigines were recognised as the exclusive owners of all that part of the state which is limited eastwards by the course of the Missouri. They even possessed a small reserve on the left bank of the river between the two towns of Pierre and Chamberlain, while in the north the territory guaranteed to them stretched from North Dakota as far as the Cannon-ball River. The great Sioux reserve, comprising altogether 22,000,000 acres, is divided into six districts administered by a special agency, with government officials, teachers, doctors, smiths, and carpenters. The nation consists of about a dozen tribes, each with several sub-divisions variously named either from the territory occupied by them, or from their chief station, or else from some distinctive tribal mark. Originally the Sioux or Dakota nation comprised "Seven Great Council-fires," which were not only famed in the national traditions, but actually known to the early white pioneers.

According to the treaty of 1868 nearly all were confined to the reserve, and later the Federal Government would no longer permit a single Indian to reside outside the district. In 1891 the central part of that district was detached from the rest, and immediately occupied by a swarm of white farmers and speculators. The other domains still reserved to the natives cannot fail to be similarly appropriated in the near future. The famous "pipeclay" quarries, which were situated in the Sioux territory, but which had always been regarded by the Sioux themselves as the common property of all the Redskins, have already been seized by the whites.

South Dakota enjoys a warmer climate and is better watered than the northern state. As it also possesses a greater extent of fertile lands, and lies nearer to the centres of trade, it has naturally attracted more settlers and has in every respect made greater material progress than its less favoured neighbour.

In South Dakota the chief centres of population gravitate towards the fertile grain-growing lands in the eastern section along the Minnesota frontier. Here the industrial city of *Sioux Falls* stands on the Big Sioux River at the point where the stream rushes over rapids yielding sufficient motive power for the establishment of flour-mills and other factories. At these rapids the river has a total fall of nearly 100 feet. *Yankton*, the old capital, so called from the Dakota tribe of that name, was founded 60 miles south-west of Sioux Falls, near the south-east corner of the state, and on the left bank of the Missouri, which in this part of its course is open to steam navigation throughout the year. It stands at an altitude of 1,200 feet above the sea, on a flat plateau nearly surrounded by a semicircle of bluffs.

Farther up on the same river are some rising places, such as *Chamberlain* and *Pierre*, present capital of the state. This place occupies the site of the old station of *Pierre Chouteau*, which had been founded by the Canadian voyageurs in the midst of the Dakota Indians for the peltry trade. *Aberdeen*, which lies in the interior of the state, owes its prosperity to its position at the converging-point of several lines of railway.

Numerous white settlers have lately been attracted to the mineral districts of the Black Hills in the south-western part of the state. *Deadwood*, near which have been discovered some rich auriferous deposits, lies about 250 miles north-west of Yankton, and is the chief business centre in this mineral region.

14.—Iowa.

The State of Iowa, so named from its primitive inhabitants, the Iowa or Ioway branch of the Dakota nation, is conterminous with Minnesota on the right bank of the Mississippi. In the eastern section the land falls in a long gentle incline towards the main stream; in the west another somewhat more abrupt slope drains towards the Missouri, which here forms the parting-line towards the state of Nebraska. But the highest crests of the divide between the two basins nowhere attain an elevation of 500 feet above the Missouri River. Eastwards Iowa is conterminous with Wisconsin and Illinois, and in the extreme north-west with South Dakota, while it is separated by a conventional line from the state of Missouri on its northern frontier.

Iowa, parts of which were formerly covered with forests, has now been for the most part brought under cultivation. Thanks to its fertile soil, a deep friable loam, its wheat and maize crops are surpassed only by those of two or three other states in the Union. Oats, barley, and other cereals are also successfully grown; many districts are well suited for stock-breeding; most hardy fruits thrive well, while the southern districts are adapted for grape-growing. Altogether, Iowa ranks high amongst the food-producing states of the Union. Its mineral

resources are also considerable, including not only bituminous coal in great abundance, but also deposits of lead, like the neighbouring states of Illinois and Wisconsin. The present population no longer comprises any representatives of those aborigines who gave their name to Iowa; nor have those Franco-Canadian pioneers who founded the first white settlements anywhere left a sufficiently numerous posterity to form separate French-speaking communities. Even the far more recent German and Scandinavian immigrants have already been absorbed in the dominant Anglo-American settlements.

Dubuque, the chief city of Iowa, on the right bank of the Mississippi, is the oldest in the state, and one of the first settlements in the Far West. In 1788 the Franco-Canadian trader, Julien Dubuque, had already built himself a log-hut in this place in the midst of the surrounding Sac Indians, and although at first expelled, he returned and taught the natives the art of working the neighbouring lead-mines. But no permanent station was founded, or any colonisation in the strict sense of the word begun, till the year 1833, after the Indians had surrendered the territory to the Federal Government. Dubuque, which is 200 miles south-west of Chicago, stands on a terrace on the slopes of the hills opposite the common frontier of Wisconsin and Illinois on the east side of the river, so that the bridge here crossing the Mississippi serves to connect all three states. Like Galena, its Illinois neighbour, it derives some of its wealth from the lead and zinc mines of the district; but in recent times the mining interests have been surpassed in importance by its riverine trade with Saint Paul and Saint Louis, and by the numerous local industries, such as woodenware, leather, machinery, brewing, flour-milling, and soap-works.

Davenport, another flourishing place on the west bank of the Mississippi, 70 miles due south of Dubuque, occupies an advantageous position at the lower end of some rapids by which all navigation is arrested during seasons of long drought; even for some 20 miles above the upper rapids the ordinary river traffic is at times much endangered by shoals and reefs. Thanks to one of the finest bridges on the Mississippi, Davenport forms practically a single city with Rock Island and Moline facing it on the Illinois side.

Muscatine, on an abrupt bend of the main stream 30 miles below Davenport, serves as a forwarding depot for the produce of the Red Cedar Valley, where are situated the thriving towns of *Cedar Falls* and *Cedar Rapids*. Muscatine, which dates from 1836, crowns the rocky bluffs overlooking the Mississippi nearly opposite the confluence of the Rock River on the Illinois side. Lower down follows the valley of the Iowa River, where is situated *Iowa City*, which was the capital of the state from 1839 to 1855.

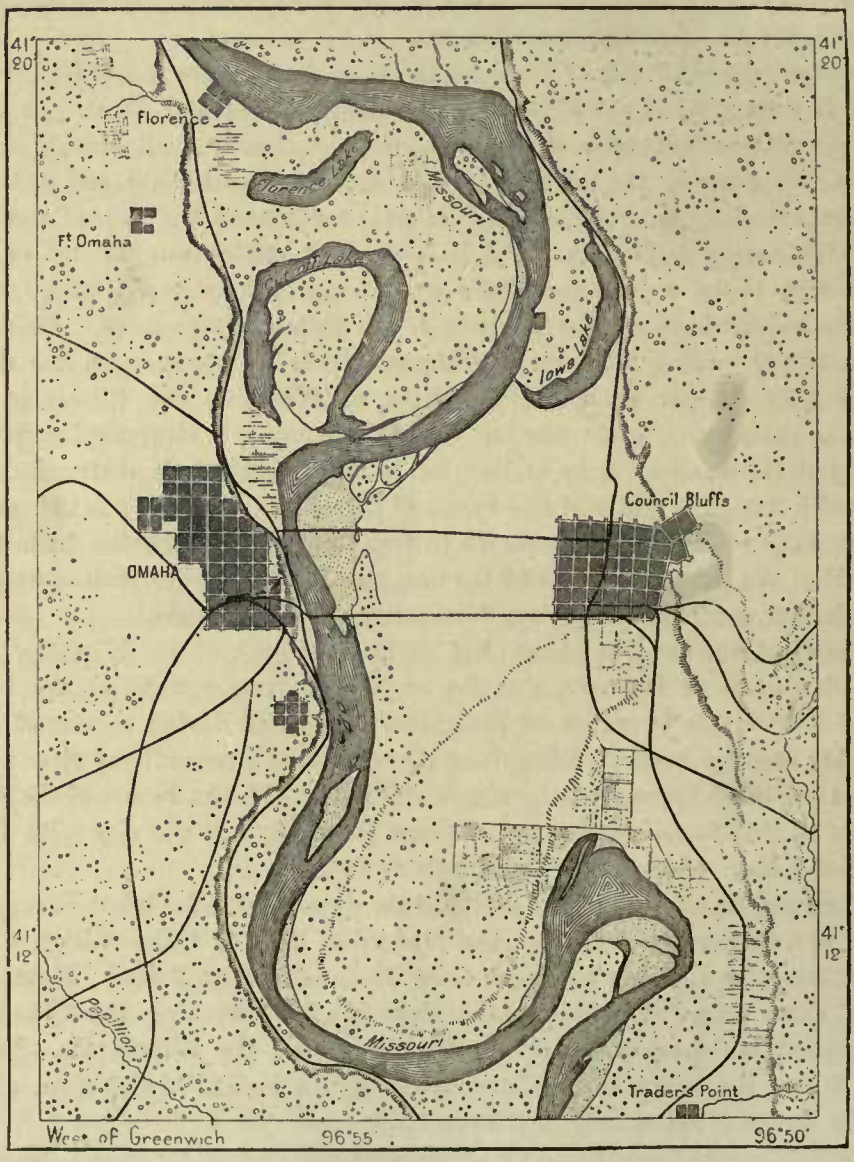
Burlington, which lies on the Mississippi 82 miles below Davenport, near the south-east corner of the state, had been the seat of the administration before Iowa City. Although now deprived of that honour it is one of the important commercial and industrial places between Saint Paul and Saint Louis.

Des Moines, the present capital, stands on the site of an ancient "Council-fire," where the Moins (Moines) Indians held their tribal gatherings. After

driving out these natives, the Americans here erected a fort at the confluence of the Des Moines and Racoon Rivers, and the new settlement, having the advantage of being situated in the central part of Iowa 174 miles west of Davenport, was chosen as the state capital in 1855. Since then, thanks to the convergence of

Fig. 144.—Council Bluffs and Omaha.

Scale 1 : 125,000.



numerous lines of railway, Des Moines has become the largest city in the state. It has several fine public buildings, including a magnificent capitol erected at a cost of $3,000,000, and a marble edifice built by the Federal Government for a post-office and courthouse.

Below the capital the Des Moines River, here flowing south east to the Mississippi, passes the thriving industrial city of *Ottumwa*, 75 miles north-west of Burlington. On the peninsula formed by the two converging rivers at the south-east angle of the state stands the city of *Keokuk*, or the "Wideawake Fox," so named from an Indian chief friendly to the whites. Like Davenport, Keokuk lies at the foot of a series of rapids (the "Lower Rapids"), which greatly obstruct the navigation. To obviate this difficulty a ship canal, 8 miles long and 300 feet wide, has been constructed across the portage, where the stream has a total fall of 25 or 26 feet over the limestone reefs. Its position at this point gives an exceptional importance to Keokuk as a trading depot at the head of the navigation for large river-steamers throughout the year.

At the opposite side of the state, *Sioux City*, metropolis of north-west Iowa, has recently acquired a considerable expansion. Standing on the left bank of the Missouri at the Floyd confluence, and just below the mouth of the Big Sioux River 100 miles above Omaha, this place has gradually attracted the trade of a vast region, comprising parts of South Dakota and Nebraska. No other city of Iowa has advanced more rapidly in population and general prosperity, the number of inhabitants having increased more than fivefold during the decade between 1880 and 1890. *Council Bluffs*, which lies much farther down on the same side of the Missouri, and 120 miles south-west of Des Moines, may be called a historical city. Even before the foundation of the white settlement its site was known to historians as the place where the prairie Indians of the Far West were wont to hold their great tribal gatherings, whence its name of "Council Bluffs." The Mormons also erected a village on the spot during their westward emigration in 1846. Later it became a provision depot, where military and commercial expeditions were organised and equipped for the Rocky Mountains and New Mexico. At present it is one of the great stations on the Chicago Pacific and Union Pacific trunk lines, being connected with its neighbour Omaha, on the Nebraska side, by two bridges which here cross the Missouri and its broad bottom-lands. The city stands partly on the bluffs, but mainly on the plain at their foot, nearly four miles east of Omaha.

Near *Corning*, at the south west angle of the state, there is a small community of French socialists, survivors of the colony of *Icaric* founded by Cabet in the year 1849. Corning stands on a branch of the Nodoway River about 70 miles south-west of Des Moines. Between the capital and Iowa City some German communists have formed a more flourishing colony at *Amana* township, which comprises four villages, encircled by undulating hills under grass, cereals and fruit trees.

15.—Nebraska.

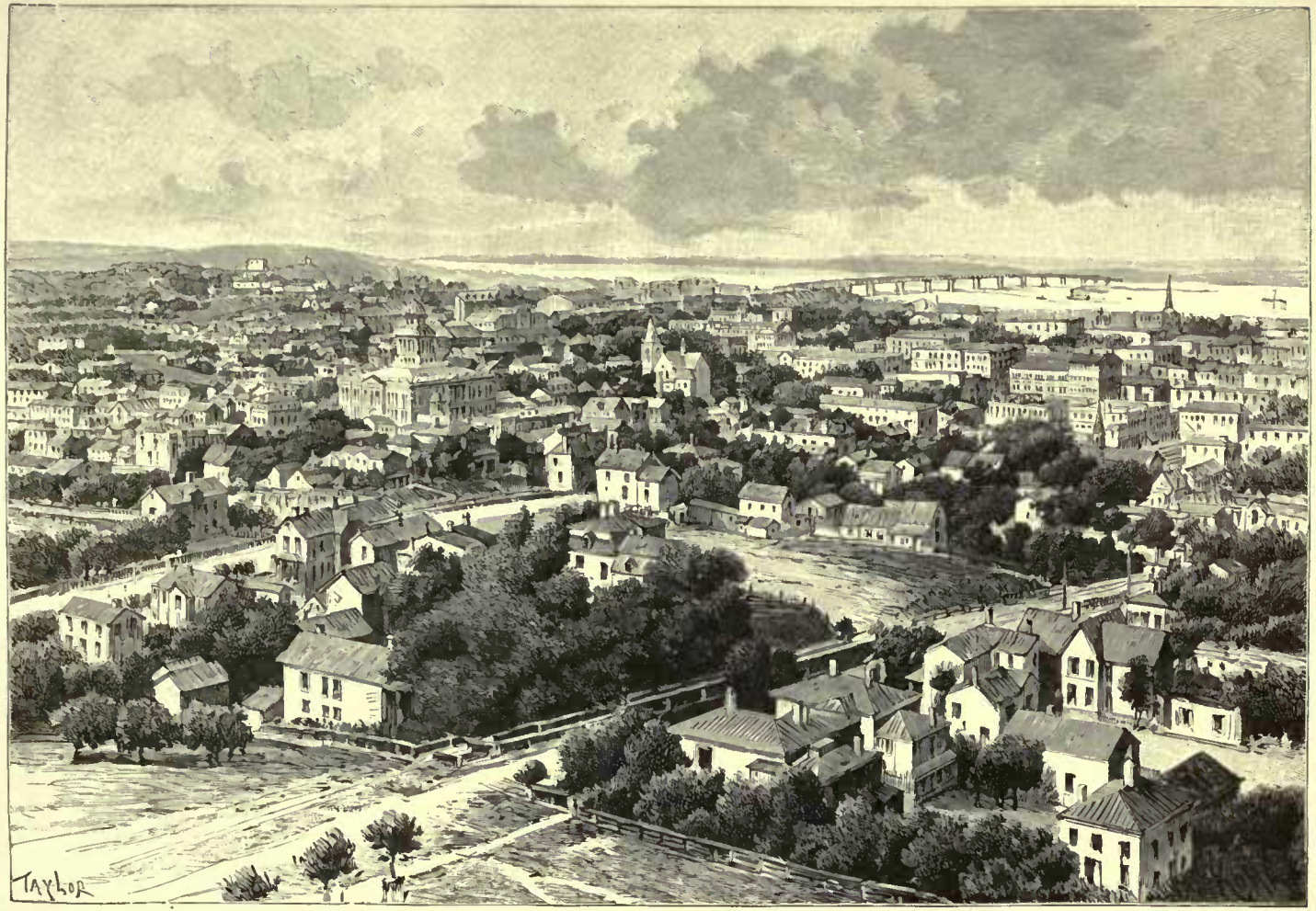
This state takes its name from the Nebraska or Platte River, by which it is traversed from west to east, through a series of elongated meanderings. Except on the north-east and east where it is bordered by the Missouri, separating it from South Dakota, Iowa and Missouri, Nebraska is everywhere bounded by conventional straight lines forming the frontiers towards Dakota on the north, Wyoming

and Colorado on the west, and Kansas on the south. It thus forms a long parallelogram rising from the Missouri valley by insensible gradations through the steppe region and the Great Sand Hills towards the Rocky Mountains. In the extreme north-west the ravined plateaux of the "Bad Lands" (the *Mauvaises Terres* of the Canadian pioneers) reveal their storied cirques, their fantastic domes and decorated pinnacles. But this absolutely barren tract, with its strangely shaped clayey masses shooting up to heights of from 50 to 200 feet, occupies but a comparatively small part of the state. In the north a far more extensive space is covered with ranges of sandhills, with intervening alluvial bottom-lands forming treeless steppes, which could be rendered productive only by artificial irrigation.

Although Nebraska is essentially an agricultural region, many industries have sprung up and continue to progress with the development of the railway system in the eastern districts. Thanks to its favourable position on the main commercial highway between the east and west, the population has increased with great rapidity in recent years, advancing from little over 20,000 in 1870 to upwards of 1,000,000 in 1890. It consists almost exclusively of whites, partly Anglo-American settlers, partly immigrants from Europe. A few narrow tracts, like islands surrounded by the surging tide of white colonisation, had been reserved for the aborigines. Such was the enclave of the Santees (Isanti), a Dakotan tribe of about 700 souls, who after having taken part in the Minnesota massacres of 1863, had been relegated to this district, where they have been gradually merged in the surrounding populations. In other words they have abandoned their tribal usages, and have thus become American citizens, each owning a separate plot or holding, which he can sell or exchange at pleasure. The result is that a considerable part of the reserve has already passed into the hands of the "palefaces," while the owners are disappearing.

Like the other West Central States, Nebraska became part of the United States domain by the Louisiana purchase of 1803. It successively formed part of the Louisiana and Missouri Territories down to the year 1854, when the so-called Missouri Compromise of 1820 was revoked, and the eventful Nebraska bill voted by the Federal Congress, after a fierce political struggle between the Abolitionist and Slave parties. But general progress was so slow that Nebraska was not organised as a state till the year 1867. Since then, but especially since the completion of the Union Pacific Railway traversing its territory, Nebraska has entered on a career of remarkable prosperity, checked only by an occasional visitation of locusts from the great plains east of the Rocky Mountains.

Omaha, former capital of Nebraska, still remains its largest city. Founded in 1854, it owes its prosperity to its favourable position on the right bank of the Missouri opposite Council Bluffs, and at the most frequented crossing of the river. This position, combined with its extensive railway communications, has raised it to an important position amongst the industrial and commercial cities of the Union; in the meat-packing business it takes a particularly high rank. One of the two bridges spanning the Missouri at this point, which lies 18 miles above the Platte confluence, is a magnificent structure erected at a cost of $1,500,000.



GENERAL VIEW OF OMAHA.

Lincoln, present capital of Nebraska, lies 50 miles south-west of Omaha on Salt Creek, in the middle of the prairie where it sprang almost suddenly into existence. Its first houses were erected in 1867, and the very next year it became the state

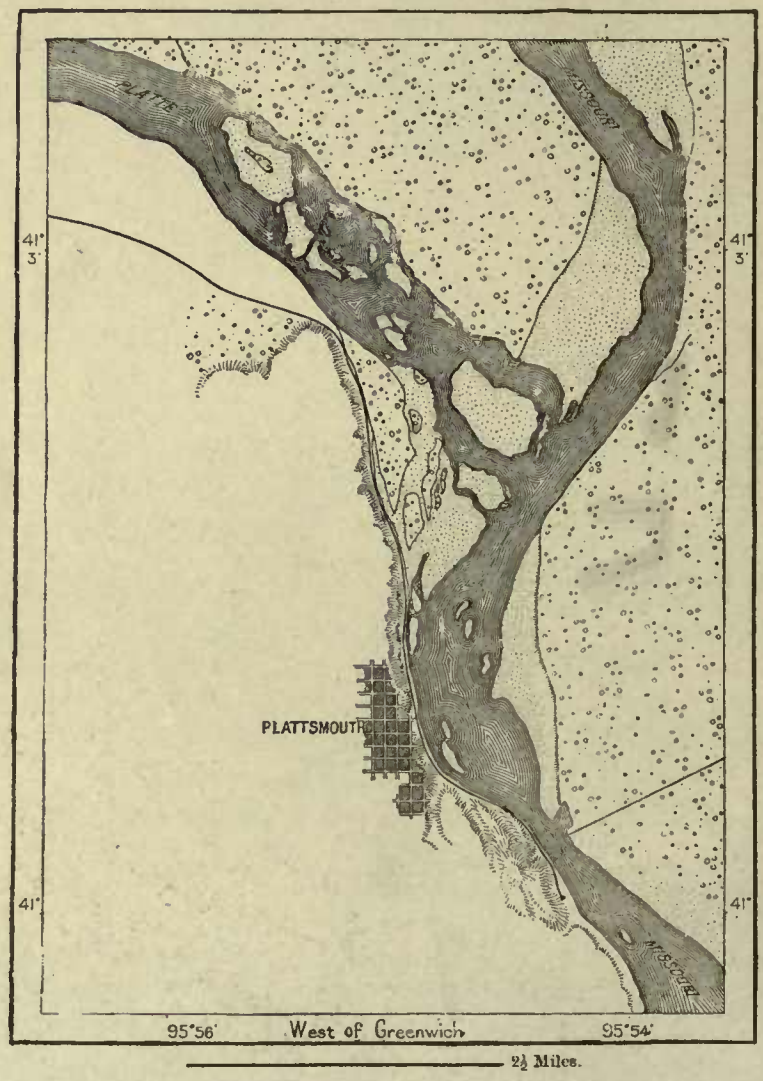
Fig. 145.—View taken in the Bad Lands, Nebraska.

capital. Here are the Nebraska State University and Agricultural College, open to students of both sexes. *Nebraska City*, on the Missouri, lies 50 miles south-east of Lincoln, and is accessible to large steamers both from the upper and lower reaches. This place faces East Nebraska City, a small station on the opposite

(Iowa) side of the river. A little higher up stands *Plattsmouth*, within two miles of the Platte confluence, which is visible from this point.

Beatrice lies 40 miles in a bee line south of Lincoln, on the Big Blue River, a northern affluent of the Kansas. From its position on this river it has taken the fanciful title of the "Queen of the Blue." Here are some quarries of magnesian

Fig. 146.—Missouri-Nebraska Confluence.
Scale 1 : 64,500.



limestone, an excellent building material. Towards the centre of the state the most important trading places are *Grand Island* and *Hastings*, the former on the Platte River at a point where the stream bifurcates round an island 50 miles long.

16.—Missouri.

This state, in some respects one of the most important in the Union, takes its name from the great river which forms its north-west frontier towards Nebraska

and Kansas, and then traverses it from west to east. The east frontier towards Illinois, Kentucky and Tennessee is formed by the Mississippi, which in this section of its course is joined by its two great tributaries from the east, the Illinois and the Ohio. The state of Missouri thus occupies the true hydrographic centre of the United States, with the immense advantage of direct access to many thousand miles of navigable waterways radiating in all directions. Hence its very position naturally made it one of those regions which were most hotly contested by the free Northern and slave-holding Southern States. When the inhabitants of Missouri, at that time controlled by a small aristocracy of planters, applied for the admission of their territory into the Union, they refused to consent to the abolition of slavery, as stipulated by previous conventions agreed to by both parties. Such was the bitterness of feeling called forth by this refusal, that a sanguinary conflict long seemed all but inevitable. At last rival interests were to some extent reconciled by the "Missouri Compromise," in virtue of which the new state entered the Federal Union without abolishing servitude, but on the express condition that henceforth this institution should never be introduced into any other territories north of 36° 30′ north latitude. Nevertheless the struggle broke out again during the early years of the settlement of Kansas, and during the Civil War the Northern and Southern forces came into violent collision in south Missouri.

In the northern section of Missouri the plains, of glacial origin, are continuous with the Iowa region, and are almost flat, or but slightly rolling. But south of the great watercourse intersecting the state the aspect of the land is greatly diversified by the Silurian Ozark Mountains towards the centre and by the fertile and well-timbered marshy and submerged tracts in the south-eastern parts. Nearly the whole surface of the state is suitable for tillage, and agricultural produce, such as maize, wheat, barley, hemp, tobacco, fruits, fodder and livestock, constitutes its chief wealth. Nevertheless its mineral resources, especially lead, iron, coal, and zinc, are steadily acquiring increasing importance, while the large cities are assuming more and more the aspect of great manufacturing centres. The lead zone, which traverses the state from east to west, is practically inexhaustible, containing sufficient of this metal to supply the wants of the whole world for an indefinite period. The chief coal-measure, mainly cannelite or bituminous, covers a total area of over 20,000 square miles, about one-third of which can be profitably worked. Stores of excellent hematitic and magnetic iron ores existed in the Iron Mountain, Pilot Knob and Shepherd Mountain districts, but some of them are now exhausted. Amongst the other mineral treasures are nickel and copper ores, cadmium, some gold and silver, barium sulphate, kaolin, glass-sand, and fireclay.

Owing to the two currents of immigration from the Southern and the free Northern States, the population of Missouri is of a very mixed character, and still comprises over 150,000 blacks. Of foreigners the most numerous class are the Germans, who were estimated in 1890 at 800,000, including those born in the States. On the other hand the full-blood aborigines have disappeared, although half-breeds are numerous amongst the French inhabitants.

Missouri was first settled by the French, who built Fort Orleans near the site of the present Jefferson City in 1719, St. Genevieve in 1755, and Saint Louis nine years later. The whole region was included in the province of Louisiana, and although portions were claimed by Spain, it passed to the United States with the Louisiana purchase in 1803. After the "Missouri Compromise" of 1820, it was admitted to the Union in 1821, the section not comprised in the state retaining the title of Missouri Territory down to the year 1854. This territory was of vast extent, stretching westward to the foot of the Rocky Mountains and northwards to British North America. The state itself was not finally adjusted to its present limits till the year 1835. But long after that period it continued to be convulsed with social troubles due to the divided character of the inhabitants, the democrats from the South clinging tenaciously to the institution of slavery, to which the Northern republicans were fiercely opposed. Thus, during the Kansas troubles of 1854, the inhabitants of the western districts violently resisted the free-state movement, and this conflict, which was continued with little interruption down to the Civil War, gradually spread to almost every part of the state. It was everywhere attended by riots and disorders of all kinds, and a sort of guerilla warfare was kept up in some districts for over ten years after the close of the Civil War.

The slave party were at no time strong enough to induce the state to join the Confederates; but many districts were, nevertheless, the scene of several hotly contested conflicts between the hostile forces. Since the restoration of order the "Pennsylvania of the West," as Missouri has been called, has made steady though not rapid progress in the development both of its agricultural and mineral resources. The growth of the population has also been retarded by the emigration of many thousand descendants of the early French and English settlers, who have largely contributed to the settlement of California, Oregon and other Pacific states.

A few busy agricultural centres, such as *Hannibal* and *Louisiana*, have sprung up along the banks of the Mississippi above the Missouri confluence. More important are the towns situated on the section of the Missouri forming the north-west frontier. *Saint Joseph* especially has become one of the great converging points of the trans-Mississippi railways. Nevertheless, the development of the railway system has deprived it of the importance which it formerly possessed as the point of departure and chief depot of the convoys which were here prepared for the long and dangerous journey across the western solitudes to the Rocky Mountains. Near the right bank of the Missouri, where it has already entered the state, stands the village of *Independence*, which played a corresponding part to Saint Joseph in organising convoys of traders for New Mexico in the south-west. This place was at that time the most advanced outpost of American civilisation on the verge of the desert, some 220 miles west of St. Louis. *Kansas City*, one of the great urban groups of the Far West, lies 10 miles west of Independence, on the right bank of the Missouri, half a mile below the Kansas River confluence. Kansas City consists officially of two cities separated by a conventional line, one, much the larger of the two, in the state of Missouri, the other in the adjacent state of Kansas. The eastern quarter is the more commercial, the western the

more industrial, over a hundred foundries, meat-packing establishments, machine factories and other workshops being here grouped on the bottom-land which skirts the river, and which is crossed by magnificent viaducts and connected by a prodigious network of railways with the surrounding regions. Kansas City rivals Chicago itself in the beef and pork packing business; in 1890 it received by rail as many as 2,890,000 hogs and 1,550,000 head of cattle. The population advanced from less than 5,000 in 1860 and 32,000 in 1870, to over 170,000 in 1890, including the suburb on the Kansas side of the Missouri. Here the river is spanned by a superb iron bridge which carries the lines of several railway companies.

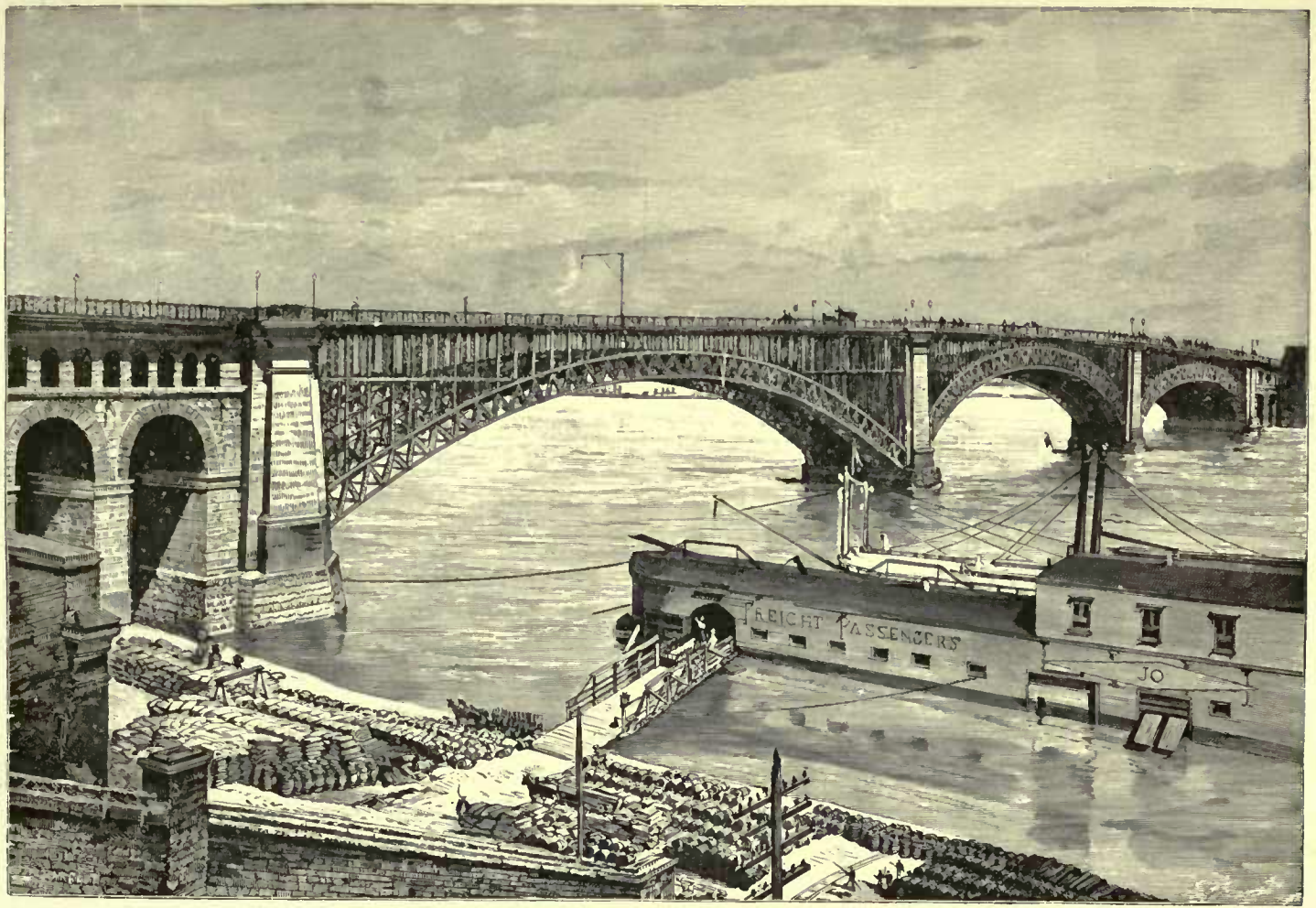
Saint Louis, founded in 1764 by Pierre Laclède Liguest, as a trading station for peltries, on the west bank of the Mississippi over forty years after the erection of the more westerly post of *Fort Orleans* at the Missouri-Osage confluence, has long ceased to be French except in name. Most of the inhabitants, although of Franco-Canadian origin, no longer speak the language of their forefathers; even the French names of the neighbouring localities have been modified or assimilated by popular etymology to Anglo-Saxon forms. Thus the village of *Vide-Poche*, where the young bucks of those days gaily "emptied their pockets" at the suburban pleasure resorts, was transformed by the American settlers to *White Bush*, an absolutely meaningless designation; at present it forms the *Carondelet* quarter, which has been swallowed up in the southern part of the city. Next to the Anglo-Americans the largest section of the community are the more recent German settlers, who have here preserved their nationality and their mother-tongue more faithfully than in any other part of the Union except West Pennsylvania and Milwaukee. In the municipal and political elections their influence is often decisive. Saint Louis occupies two terraces rising one above the other like the two outer steps of a plateau some 12 miles below the Missouri confluence, about 175 miles above that of the Ohio on the opposite side, and 1,150 miles above New Orleans. At the time when Laclède and his companions here erected their log-huts the trading post lay more than 18 miles south of the confluence; but during the present century the city has acquired such a prodigious expansion that the distance has been reduced by about one-third. In 1888 Saint Louis had a frontage towards the Mississippi of no less than 16 miles, with an extreme breadth from east to west exceeding 6 miles; it thus covered a superficial area of some 40,000 acres, more than double that of Paris, within its present enclosures. In this area, however, are comprised as many as eighteen public parks, one of which covers no less than 1,400 acres, besides vast spaces occupied by the factories, workshops, goods and passenger stations of the numerous railways. Saint Louis is connected with its suburb of East Saint Louis on the Illinois side by one of the noblest bridges in the world, which, like the New York-Brooklyn structure, serves at once for railway carriage and pedestrian traffic. This viaduct, erected at a cost of over $10,000,000, by the same engineer, Mr. Eads, who afterwards opened the Mississippi to the largest vessels, by piercing its bar, has the immense length of 2,200 yards, including the land approaches. The bridge proper, consisting of three steel spans, gracefully curved and rising to a height of 160

feet above the stream, is only 1,590 feet long from shore to shore. This grand monument of American engineering skill is famous in the records of the mechanical industries, for the numerous processes which were for the first time applied in its erection. Connected with the viaduct is a railway tunnel, which extends 4,800 feet under the city. Since the completion of these works a second viaduct, known as the "Merchants' Bridge," has been constructed higher up the Mississippi.

During the half-century following its foundation, Saint Louis continued to be nothing more than a fur-trading station. But with the progress of settlement the products of the chase gradually gave place to those of husbandry. The metropolis of Missouri became a great forwarding depot for the wheat and flour of the West, and it now rivals Chicago in this branch of trade. Since the Civil War it has also become the outlet for the cotton of Arkansas. Of local industries the most extensive is brewing, which draws an unlimited supply of barley from the surrounding states. One of the large breweries, covering a space of 30 acres, employs 1,200 hands, and exports its beer in large quantities to the West Indies, South America, and Australia. Saint Louis also possesses several important flour-mills, as well as one of the great refineries of the world, in which are treated all the sugars of Louisiana and Hawaii, besides some of those grown on the plantations of Havana and Matanza in Cuba. The foundries and other metallurgic works receive their supply of ores from the interior of the state, and their coal from Illinois. The plate-glass industry is also centred in Saint Louis and its extensive environs, where *Crystal City*, lying also on the right bank of the Mississippi some 30 miles farther down, has been called the Saint Gobain of America. In 1887 the trade carried on by rail and river represented a total of nearly 14,500,000 tons, an amount of traffic exceeded by few maritime ports.

Thus Saint Louis, geographically the most central of all the large cities of the Union, has now also become the commercial metropolis of the middle Mississippi basin. Its prospects in this respect are scarcely inferior to those of the great emporium of Lake Michigan and the Saint Lawrence basin. It also takes a high rank amongst literary and scientific circles, and is the seat of the Saint Louis and the Washington University.

Saint Genevieve, on the Mississippi about 60 miles below Saint Louis, and *Cape Girardeau*, 80 miles still lower down, have but little trade ; their interest is chiefly historical, both dating from the French period and recalling the pioneers of colonisation along the banks of the middle Mississippi. Saint Genevieve was founded in the year 1763, when many of the French settlers on the opposite side, at that time somewhat numerous, moved westwards and formed the new settlement on the right bank of the river. But it stood too near the stream, and to avoid the periodical floodings it had to be removed farther inland. *New Madrid*, which the Spanish Government had peopled with French-Acadians who had sought a refuge in New Orleans, has remained an obscure village on the Mississippi about 40 miles by the direct route south-west of Cairo. The very traces have disappeared of the ambitious plan which was to make Nueva Madrid "the finest city in the universe." All these early settlements of the French squatters have



SAINT LOUIS BRIDGE.

been eclipsed by several more modern places in the interior of the state, which although less favourably situated for trading purposes, have the advantage of lying in the centre of rich agricultural and mineral districts. Such are *Sedalia* and *Springfield*, the former 190 miles by rail west of Saint Louis, with extensive railway rolling-stock works, the latter 240 miles south-west of Saint Louis, with woollen, machinery, engine and boiler manufactories.

In south Missouri the two chief groups of mines are those of *Iron Mountain* and the lead and zinc deposits of which *Joplin* and *Granby* are the industrial centres. The hill from which Iron Mountain takes its name lies 80 miles south by west from Saint Louis, and rises about 300 feet above the neighbouring plain. It consists mainly of excellent hematite ore containing about 70 per cent. of metal, and described as heaped up "in masses of all sizes from a pigeon's egg to a middle-sized church." Joplin and Granby are situated in the south-western corner of the state in the midst of numerous productive lead and zinc mines. Joplin, where mining operations are most active, has sprung up suddenly in the midst of a mining population already numbering over 50,000. Here the lead and zinc ores are treated directly in numerous furnaces and other workshops. The output of the Joplin zinc-mines represents three-fourths of the total yield in the United States, and perhaps one-seventh of that of the whole world.

17.—Kansas.

This state has a natural frontier only at its north-east corner, where it is separated from Missouri by the course of the Missouri River. Elsewhere all the lines of demarcation coincide with meridians or with parallels of latitude; on the north the 40° north latitude separating it from Nebraska, on the west the 102° west longitude from Colorado, in the south the 37° latitude from Oklahoma and Indian Territory, and on the east the meridian of 94° 38′ west from Missouri. The river whence the state takes its name traverses it from west to east, and by far the greater part of this fluvial basin is comprised within its limits. A section of the Arkansas also flows through the south-western district. Within its conventional limits Kansas stretches east and west about 400, north and south some 200 miles, with a superficial area almost exactly equal to that of Great Britain less the principality of Wales. The surface is mainly a rolling plain at a mean height of about 2,000 feet above sea-level, but gradually rising from the banks of the Missouri (600 or 700 feet) to the Colorado frontier, which has a mean altitude of considerably over 3,000 feet. The monotony of the undulating steppe is scarcely anywhere broken except by the broad, wooded bottom-lands traversed at intervals by the watercourses, and presenting, so to say, ready-made cuttings for the lines of railways constructed along the foot of the lateral escarpments.

Although the region at present occupied by the state of Kansas formerly figured on maps as the "American Desert," it by no means deserves this designation, despite the occasional long periods of drought to which it is subject, and which often cause great distress. Between the years 1888 and 1890 the popula-

tion even diminished by about 90,000, and farmers emigrated in thousands to the surrounding states. The crops have also frequently suffered much from the visitation of locusts. But in favourable seasons Kansas takes a foremost position amongst the States of the Union for the production of cereals and corn, which in 1891 represented a total sum of about $200,000,000. The soil consisting almost everywhere, and especially in the river bottoms and bench-lands, of a rich black loam, is well suited for tillage and adapted for the cultivation of all those plants that flourish best in the middle temperate zone.

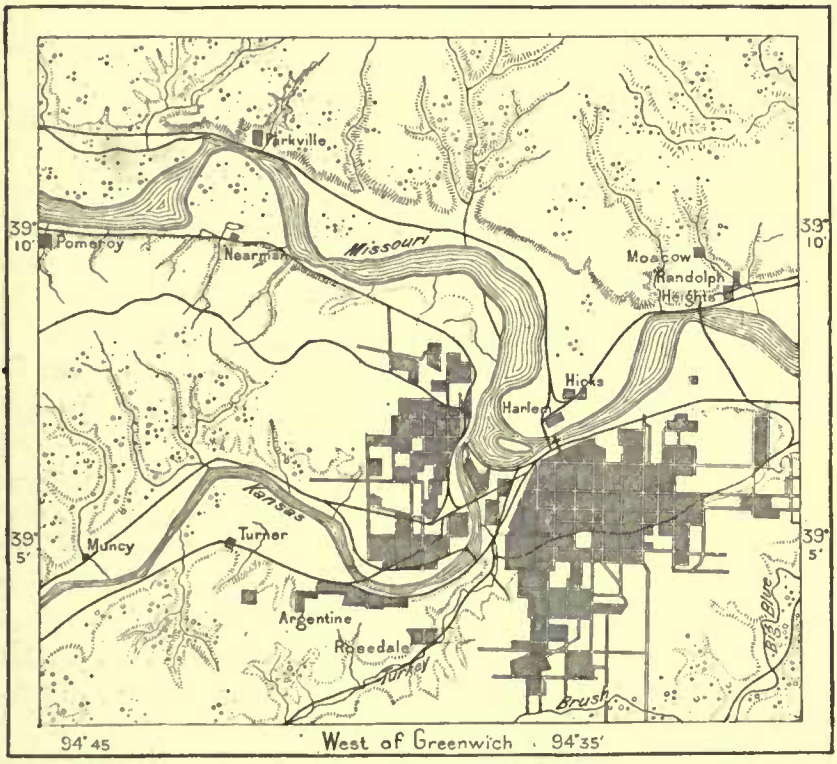
Kansas might seem to have as good a right to the title of the Central State as has Missouri. The latter no doubt occupies the hydrographic centre of the Union, whereas the former lies in the geometric centre, though at some distance from the axis of the Mississippi basin. Excluding Alaska, the mathematical centre of the United States is approximately indicated by a monument set up near the city of Fort Riley, at the converging point of Smoky Hill and Republican Rivers, whose junction forms the Kansas. From a characteristic flower of its prairies, Kansas has also been called the "Sunflower State." The river banks and bottoms are still covered in places with forest trees, such as the ash, elm, cotton-wood, mulberry, and several species of maple and oak. But scarcely five per cent. of the whole area is under timber, and all the magnificent black walnut-trees that formerly fringed the banks of the Kaw or Kansas have long disappeared.

Admitted late into the Union, Kansas was from the first a fiercely-contested battlefield between the slave-holding planters and the northern abolitionists. So frequent were the collisions that at that time it was known as "Bleeding Kansas," and the electors went to the voting booths with their ticket in one hand and a bowie-knife in the other. According to the Missouri compromise of 1820 slavery was certainly interdicted in this territory, but the pro-slavery planters from Missouri made the most strenuous efforts to extend their institutions to the new State. At one time their success seemed assured, supported as they were by the Federal forces, and by the unconstitutional weapons of the so-called "border ruffians," that is bands of armed desperadoes whom they sent into Kansas to control the elections, or falsify the returns, and even to destroy the settlements of those who advocated the doctrine of "squatter sovereignty." Rival constitutions were even set up, such as the Free State Constitution framed at Topeka in 1855, and an opposition government proclaimed by the slave party at Lecompton in 1857, though both remained inoperative. At last, after many sanguinary conflicts, in which many lives were lost and much property destroyed, Kansas was admitted into the Union as a free state. Then came the Civil War, in which she took comparatively speaking a more active part than any other state in the West, furnishing proportionately more troops to the Federal cause, and also simultaneously maintaining a fierce party struggle all along the borders, and beyond them, into some of the conterminous states. After the general peace Kansas rapidly recovered from her wounds, and entered on an era of steady material progress. Besides its immense agricultural resources, this state possesses considerable mineral wealth, especially many thousand square miles of middle and upper carboniferous strata, the former

very productive and abundant in the south-eastern districts. Rich lead and zinc deposits also occur in the valley of the Neosho affluent of the Arkansas River.

The Kansas valley was first visited by the Spanish expedition under Coronado, who traversed the whole region from south to north. It was again explored in 1719 by some French adventurers, led by Dutisne; but no permanent white settlements appear to have been anywhere made before the present century. Most of this region became part of the Union through the Louisiana purchase of 1803; but the south-western district, originally claimed by Spain, remained an integral

Fig. 147.—The Two Kansas Cities.
Scale 1 : 220,000.



part of Texas until five years after its annexation. In 1850 Texas ceded this region to the Federal Government.

In 1825 a first serious attempt was made to open the country by establishing the so-called "Santa Fé Trail," by which an extensive overland trade was developed with the southern and south-western regions. In 1831, the first Protestant missions were founded amongst the local Indian tribes, and these were soon followed by those of the Roman Catholics conducted by the Jesuits, who founded the Osage and the Pottawatomie missions in 1847.

The population is concentrated, especially in the eastern parts of the state, along the banks of the Missouri and Lower Kansas. Here *Atchison* and *Leavenworth* occupy analogous positions on the right bank of the Missouri, the former 35.

the latter 70 miles below Saint Joseph. Near Leavenworth stands a fort which was erected in 1827, before the first squatters had yet crossed the Missouri. This military station, which long formed the bulwark of the West against the Indians, was also the starting point of numerous scientific expeditions to the Rocky Mountains. Hence the frequent mention of *Fort Leavenworth* in the records of geographical exploration down to the middle of the century. *Topeka*, capital of the state and rival of Leavenworth in commercial importance, stands on the south bank of the Kansas over against an extensive suburb on the opposite side. Its Indian name is said to be derived from the wild potatoes, which still grow in abundance on the neighbouring bottom-lands. Topeka, which is distant 67 miles west of Kansas City, Missouri, is the seat of Washburn College (Congregational), and of several other educational institutions. *Lawrence*, on the south bank of the Kansas River, about midway between Topeka and the Missouri confluence, is pre-eminently the historical city of Kansas. Its first settlers, all abolitionists from New England, had named it *New Boston*, which the pro-slavery immigrants from Missouri afterwards changed to *Yankeetown*. They several times plundered it during the troubles of 1856, and again in 1863 during the civil war.

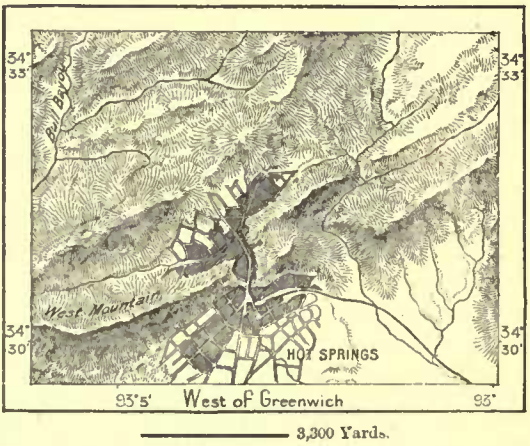
Although chosen as the seat of the University of Kansas, founded in 1864 and open to both sexes, Lawrence has progressed less rapidly than its neighbour, *Kansas City*,[1] which lies at the junction of the Kansas and Missouri Rivers. Although commercially little more than a western suburb of Kansas City, Missouri, this place is already the largest city in Kansas, with a population of over 40,000, in 1891. *Fort Scott*, on a small affluent of the Osage, in the south-eastern part of the state, dates from the year 1842, when a fortified post was erected here as a bulwark against the Indians. At that time it was an important military station, at present it is a flourishing centre of trade, industry, and coal-mining. In the section of the Arkansas River lying within the limits of the state, the chief place is *Wichita*, which stands at the head of the fluvial navigation, and at the confluence of the Little Arkansas, 85 miles south-west of Emporia. Thanks to its advantageous position, Wichita has become one of the most flourishing cities in Kansas, with a population of about 25,000.

18.—Arkansas.

Arkansas, pronounced Arkansaw, takes its name, like Kansas, from the river, the lower course of which traverses the state from west to east to the Mississippi confluence, about midway between Memphis and Vicksburg. On the east side the great river forms a natural frontier towards Tennessee and Mississippi, but almost everywhere else the boundaries are formed by geometrical lines, on the north towards Missouri, west towards Indian Territory and Texas and south towards Louisiana. The monotony of these lines, however, is somewhat broken in the north-east by an intruding corner of Missouri, and in the south-west, where for a short distance the Red River bounds an intruding corner of Texas. The surface is mainly a rolling prairie diversified chiefly by the broken range of the Ozark

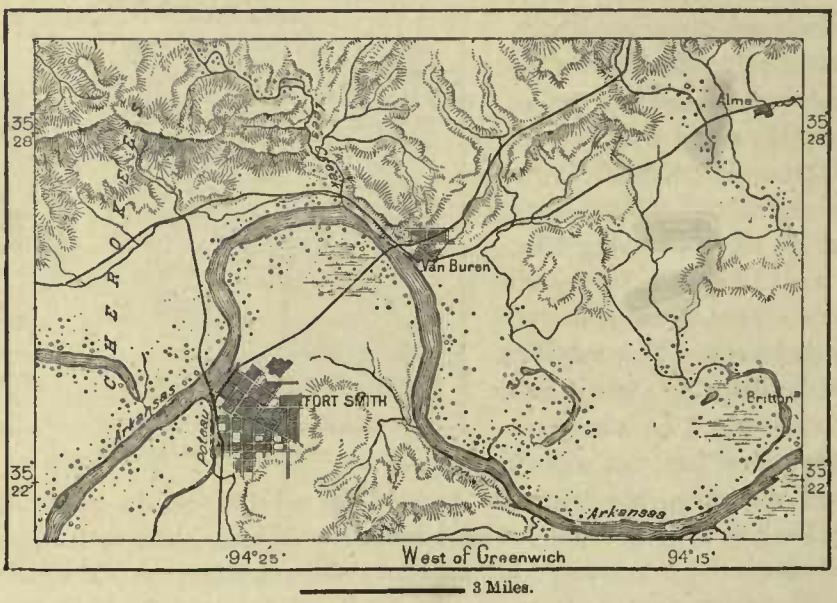
Mountains, which stretch south-westwards between Missouri and the Arkansas River, with numerous outlying spurs, such as the Black Hills in the north, the Washita Hills in the south, and the Cane Hills in the north-west, all apparently belonging to the same orographic system, but nowhere attaining any great elevation. Eastwards, along the course of the Mississippi, there are vast marshy river-bottoms interspersed with lakes or lagoons, bayous or backwaters, generally low-lying, but protected from the periodical inundations by an elaborate system of costly dykes and embankments. From the swampy region the ground rolls westwards gradually up to the more hilly districts, many parts of which are finely timbered with the walnut, cypress, hornbeam, locust, hickory, oak and other useful forest growths. Southwards stretch numerous prairie tracks, while the extremely fertile soil of the south-eastern districts is mainly under maize and cotton. On the other hand, it will be difficult ever to bring under tillage much of the swampy and even flooded north-eastern region between the St. Francis and Mississippi Rivers. Arkansas possesses considerable mineral resources, such as coal of good quality along both sides of the Arkansas River, lignite in the south-eastern tertiary formations, productive argentiferous galena, zinc, and iron ores in several districts, copper, bauxite, kaolin, and grindstones. The valuable novaculite, literally "razor-stone" or "hone-stone," an extremely compact form of hornstone, occurs in large quantities, supplying the material for whetstones, the preparation of which has long been an important local industry. Despite these varied resources, the colonisation of Arkansas has hitherto proceeded at a slow pace. The difficulties of the navigation on the Arkansas and White Rivers, the absence of suitable sites for settlements along the low-lying banks of the Mississippi, and especially the position of the state itself, remote from the great historic highways, have tended to deflect the stream of immigration from this region. The first settlers, consisting chiefly of Canadian voyageurs and half-breeds, were regarded as the rudest and least civilised community in the Union. But the obstacles till recently opposed to progress have at last been removed or neutralised by the development of the railway system and of cotton culture, combined with the exploitation of the thermal waters and of various mines, especially of bauxite, which is now utilised for the preparation of aluminium. Formerly a part of French Louisiana, Arkansas passed to the United States in 1803, and in 1812 was included in Missouri territory. Seven years later it was detached and organised as a separate territory, and in 1836 admitted to the Union with its present limits.

Fig. 148.—Hot Springs.
Scale 1 : 150,000.



Little Rock, capital and chief commercial city of Arkansas, occupies a central position 134 miles west by south of Memphis. It crowns a slaty bluff 50 feet high on the south bank of the Arkansas River, which is accessible to this point by large steamers from the Mississippi for nine months in the year. The "Little Rock" occupied by the city is so named in contradistinction to another slaty bluff, the so-called "Big Rock," which stands two miles farther up, and rises about 200 feet above the stream. The *Hot Springs*, seventy in number, which are situated in a narrow gorge about 50 miles south-west of Little Rock, attract crowds of visitors during the summer months. These springs belong to the Federal Government, which leases them to private speculators. The waters, which hold carbonic acid and several carbonates in solution, range from a cold temperature to 100°, and even 153° F., and appear to be really efficacious for the cure of numerous chronic

Fig. 149.—Van Buren and Fort Smith.
Scale 1 : 240,000.



disorders. In the neighbourhood is a deposit of excellent novaculite. The city, which takes its name from the "hot springs," has acquired somewhat eccentric outlines by its expansion northwards up a narrow gulch between the hills, and southwards over the surrounding plain, the two sections being connected by a slender stem across the gorge.

This hilly district, which belongs to the Ozark system, constitutes the only important mountain group in the vast central region between the Appalachians and the Rocky Mountains.

On the right bank of the Mississippi the most frequented riverine port is *Helena*, which stands on the last swellings of the only rising ground that approaches the right bank of the river below the Ohio confluence. Here considerable quantities of cotton are shipped for New Orleans. At the other extremity

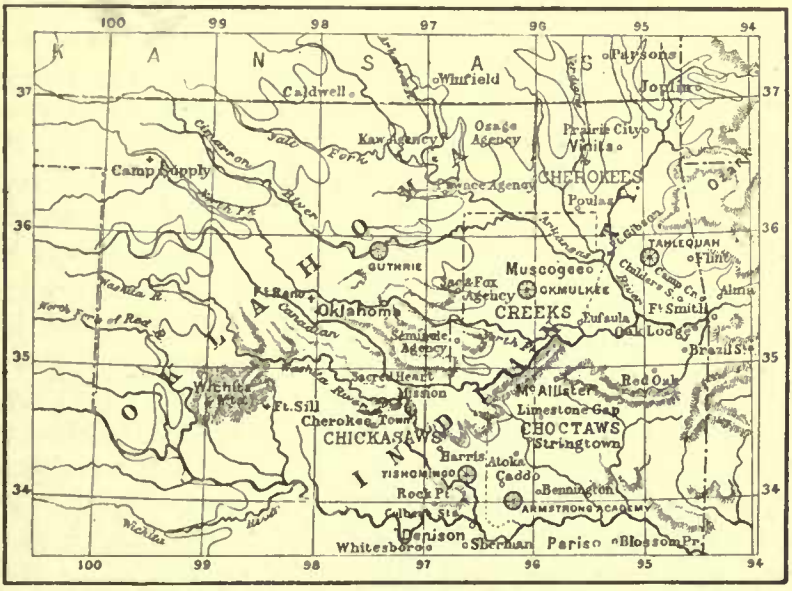
of the state the twin cities *Van Buren* and *Fort Smith*, facing each other across a sharp bend of the Arkansas, resemble the busy hives of the north in their brisk life and enterprising spirit. They are the great depots of supplies for the neighbouring Indian tribes, and more especially for the Cherokees and Choctaws, whose domain begins immediately to the west of the Arkansas.

19, 20.—Indian Territory and Oklahoma.

Until recently, Indian Territory embraced an area nearly equal to that of Kansas, and occupied the region lying between Kansas on the north, Missouri and Arkansas on the east, Texas on the south and west sides. In 1890 the western portion of this region, together with a long narrow strip lying between

Fig. 150.—Oklahoma and Indian Territory in 1892.

Scale 1 : 6,000,000.



Texas on the south, Kansas and Colorado on the north, and New Mexico on the west, was erected into the new Territory of Oklahoma. The frontiers of both Oklahoma and Indian Territory are everywhere conventional straight lines, except on the south side, where the boundaries towards Texas coincide with the course of the Red River. Although watered by this stream, by the northern and southern forks of the Canadian, the Cimarron and other affluents of the Arkansas, as well as by the Arkansas itself, this region receives too slight a supply of rainfall for all the land to be brought under cultivation. But the bottom-lands and the tracts capable of artificial irrigation yield abundant crops, while the rest of the country, formerly roamed by the bison and antelope, may be described as a vast cattle-run affording pastures for multitudes of live-stock. Indian Territory contains

extensive coal and other mineral resources. The coal is of a semi bituminous character and of good quality.

Until 1889 this entire region had been virtually reserved as an agricultural and pastoral domain for those Indian tribes that had been elsewhere dispossessed of their original lands. Hence strangers, that is, peoples of non-Indian race, could acquire rights of residence only by becoming adopted in some native community, or by intermarrying with the Indians. Such alliances became tolerably frequent, though the whites thereby lost caste, and were dubbed with the opprobrious name of "squaw-men." Meanwhile the number of palefaces thus increased from year to year to over 100,000, and their claims to manipulate the public funds and take command of the tribes led at times to much angry discussion. On the other hand, the railway companies, interpreting in their own interests certain conventions which granted them a strip of ground along the tracks, have laid claim to extensive tracts in the Territory.

The Territory has taken the Federal Union as the model of its political organisation. In the year 1870 the delegates of the various tribes which had received allotments of lands from the government, assembled at the village of Ockmulgee and decided that the common interests of their respective nations should henceforth be administered by a committee, a sort of congress, with senate and a lower house, in which each tribe, however small, should be represented. Nevertheless, the preponderance in this "parliament of nations" naturally belongs to the Cherokee people, by far the most numerous and the most civilised. During the early years of the white settlement, the Cherokees, or Tsallaki, as they called themselves, dwelt in Virginia on the banks of the Appomatox, affluent of the James River. But they were gradually crowded out by the planters, and driven towards the mountainous regions of the south-west. At the beginning of the present century this Indian nation occupied a number of villages scattered over the upland valleys of the Carolina Ranges; a few family groups had even taken refuge much farther west in Tennessee and Alabama. They were followed to their new domain by the colonists of the white race; but being protected by properly formulated treaties, the Cherokees long defended themselves in the lands which had been assigned to them. In the end they had to yield, and in 1835 they were transported bodily beyond the Mississippi, to the territory which they at present occupy in the Indian country. Of this territory they have been declared the perpetual owners, unless by becoming American citizens they cease to exist as a distinct nation, in which case they would be free to sell their lands at option. In many respects the Cherokees have already adapted themselves to the forms and spirit of American culture. They have adopted not only the political institutions, but to a large extent the very usages of the white populations. Thus they have built churches, and make use of the same religious terms in their hymns, prayers, and sermons. They support schools in which the discipline and order of studies are assimilated to those of the Massachusetts schools. Their courts of justice also have copied the American models, and their judges and pleaders have already learnt to speak the same legal jargon. Lastly the Cherokee periodical

press is conducted in the same way as that which employs the English language. The Cherokee language itself is no longer preserved except through a sentiment of national pride, and the syllabic alphabet of 85 letters, invented in 1822 by the Cherokee Sequoyah, better known as George Guest, and still employed in an official journal, is gradually falling into disuse.

The Cherokees have also become assimilated to the whites physically as well as in thoughts and social habits. While their ancestors still dwelt in the region now forming the Carolinas, some Scotch adventurers of Celtic race had formed alliances with their daughters, fairest and most charming of Indian women, and ever since that epoch such interminglings have been going on. Hence amongst the Cherokees living under the tribal organisation, half-breeds of white as well as of black race are numerous. Moreover, hundreds of whites engaged either in the industries or in politics, are constantly applying to the Redskins for Cherokee naturalisation papers. On the other hand, many even of the full-blood Indians have separated themselves from the nation, and now enjoy equal civil rights with all other American citizens. Hence it is scarcely any longer possible to form a correct estimate of the general movement of the Cherokee population, regarding which contradictory statistics have been published. Nevertheless, they are known to have certainly increased in numbers. At the time of the last great exodus they numbered little over twelve thousand, and since then they have increased to sixteen thousand. They have also advanced in social comfort. Being excellent farmers, they grow a superabundance of cereals and raise large herds of cattle, which are exported to the surrounding states. The Cherokees occupy the most favourable locality in Indian Territory, at the north-east angle of the country, on the borders of Kansas, Missouri, and Arkansas. Moreover, several smaller tribes—Quapaws, Peorias, Ottawas, Shawnees, Wyandotts, Iroquoian Senecas—are grouped near them in the same district, like chicks gathered under the mother's wing. *Tahlequah*, seat of the Cherokee legislature, on an affluent of the Arkansas, in a rich grazing country, has acquired some importance as a market, thanks to its position near the government station of *Fort Gibson*, on the Neosho River.

Fig. 151.—Cherokee Indian.

The south-east angle of the Territory belongs to another "civilised nation," that of the Choctaws, the ancient "flat-head Chactas" of the Mississippi and Louisiana, who, like the Cherokees, are increasing in numbers, and, like them, have grown wealthy by agriculture and stock-breeding. Their western neighbours are the Chickasaws, who formerly dwelt within the limits of the present states of Tennessee, Mississippi and Alabama. Both of these nations were removed about the year 1830 to Indian Territory, where they live in close alliance, with a common legislature, and an engagement not to sell their lands without mutual consent. Their chief station is *Tishomingo*, on the False Washita. The Creeks, or Muskhogees, that is, "Marshlanders," who were removed from Georgia in 1836, also possess a separate domain in the eastern part of the Territory between the Cimarron and Canadian Rivers. Their neighbours and kinsmen, the Seminoles, now located on the banks of the Canadian River, are descendants of those Florida warriors who offered such a stout resistance to the whites, holding out against their disciplined forces for several campaigns.

Westwards from these reservations and extending to the Texas frontier, much of the Indian country had never been allotted to specified tribes, and the remainder was being gradually repurchased from the Indians by the Federal Government, but was withheld from settlement. In the spring of 1889, however, a portion of this repurchased region, the Oklahoma country (Delightful Land), a natural park situated exactly in the centre of Indian Territory, on both sides of the Cimarron River, was thrown open to white settlers. All the preliminary steps had been taken by the railway companies, stock-breeders, and speculators, in anticipation of this opening, to take possession of the "land of promise." The very plans of cities had already been prepared, and allotments were bought and sold by auction even before the purchasers had visited them. At the appointed hour nearly 30,000 settlers, men, women, and children, crossed the frontiers from Kansas, and hastened to take possession of the new lands. Those holding pre-emptive rights laid down their boundaries; carts and waggons already traced by their ruts the line of future highways; tradesmen pitched their tents on the sites of their prospective stores; suddenly the wilderness was alive with the noise and bustle, the social and economic life of an American city. Thus appeared the cities of *Oklahoma* and *Guthrie*, the latter chosen as capital, both rising in a few days in the midst of the prairie. In consequence of this rapid settlement of the relatively small Oklahoma district which had been opened to the public, the whole western half of Indian Territory was organised as the Territory of Oklahoma in 1890, and is being thrown open to white settlement as soon as the Indian title to the land is extinguished.

21.—Louisiana.

Within its present narrow limits, Louisiana represents a mere fraction of its former extent, when it embraced all that part of the North American continent south of the Great Lakes which had been annexed to the empire of Louis XIV., and which was named from him. From the dimensions of half a continent, it has now shrunk to somewhat less than the average size of the states of the

Union. Limited northwards by the 33° north latitude, which separates it from Arkansas, it is conterminous only with two other states, Texas on the west and Mississippi on the east side. The frontiers towards these states are mainly formed by the course of the Sabine and the Mississippi respectively; but east of the delta, a small region between the coast and the 31st parallel, reaching as far as the Pearl River, is included within its borders. Next to Florida, Louisiana presents the largest extent of land under water, lakes, lagoons, bayous, swamps, and flooded tracts. These watery wastes might possibly be reclaimed and brought under cultivation by constructing a clear parting-line between land and water, and transforming Louisiana to a second Holland by an elaborate system of dikes, levees, and inner barriers. As it is, the banks of the Mississippi and of the chief bayous have at least been protected from the fluvial inundations by continuous lines of levees. The north-western parts of the state also, which are watered by the affluents of the Red River, consist of terraces, hilly ground, and prairies standing at a higher level than the low-lying alluvial tracts. Hence the population tends to gravitate towards these healthy districts, whose agricultural resources differ little from those of the neighbouring state of Arkansas. But even here no part of the land rises more than about 250 feet above sea-level. Some of the higher grounds are well wooded with valuable forest trees such as oaks, elms, cottonwood, hickory, locust, and especially pines, the Great Pine Belt stretching, with some interruption, from the state of Mississippi across the whole region westwards into Texas. But, being mostly of alluvial or post-tertiary formation, this state possesses little mineral wealth beyond the rich deposit of rock salt at Petit Anse, an extensive bed of tolerably pure sulphur in the south-west, and elsewhere some iron ores, lignite, and highly-fertilising marls. In the low-lying region the preparation of sugar is the staple agricultural industry, and in this respect the Mississippi delta takes the first place in the Union. The rice-fields, also, are already more extensive than those of South Carolina, and might be indefinitely extended along the seaboard, which is more salubrious than that of the Atlantic coast, thanks to the more rapid flow of the surface waters.

The blacks, who outnumber the white population in Louisiana, here find a congenial soil for founding rural settlements, remote from the cities and beaten tracks. Hence in some districts they have succeeded in breaking up the large estates and establishing a system of small holdings, which is the best guarantee of their independence. French is still the mother-tongue of numerous communities, some descended from the first colonists or from the Acadians expelled from Nova Scotia in 1755, some more recent arrivals belonging to the trading or artisan classes; lastly the "Creole" negroes, bred on the plantations belonging to French proprietors. The title of "Creole State" given to Louisiana has reference to the earliest white settlers in the country. The proportion of those whose mother-tongue is French is still estimated at from an eighth to a fifth of the whole population. They are numerous especially in New Orleans, where an "Athénée Louisianais" has been established to maintain the purity and extend the cultivation of the French language.

After La Salle's visit in 1691, and Iberville's unsuccessful attempt to found a permanent settlement in 1699, Louisiana was granted by the French crown to Crozat in 1712, and five years afterwards purchased by the Mississippi Company, of which the financier John Law was president. The same year, 1717, witnessed the foundation of New Orleans, which, however, did not prevent the transfer of Louisiana to Spain in 1763. Three years after its restoration to France in 1800, the whole province, comprising all the remaining French possessions in North America, was sold to the United States for $16,000,000. From the purchase,

Fig. 152.—Isthmus of New Orleans.

Scale 1 : 440,000.

however, was excluded the south-eastern district between the delta and the Pearl River, which at that time formed part of the Spanish colony of West Florida, and which passed to the United States with the Florida purchase in 1819. The Territory of Orleans was organised in 1804, and in 1812 Louisiana was admitted to the Union with nearly its present limits. A memorable event in the local history was the total defeat of the British forces by General Jackson below New Orleans in 1815. During the Civil War Louisiana, being a slave state, took an active part on the side of the Confederates. Even after the war party spirit

NEW ORLEANS—VIEW TAKEN ON THE LEVEE.

continued to run high, and the progress of the state was greatly retarded by the consequent local strife, often attended by deeds of violence.

The right bank of the Mississippi lies at too low a level to offer any convenient sites for the foundation of settlements opposite the cities of Vicksburg and Natchez, which crown the heights on the left bank. Hence on the Louisiana side nothing is to be seen except scattered houses or a few modest little riverine ports at the landing stages. Even the region of the confluence, where the Mississippi and the Red River intermingle their waters, and where some important trading place might certainly have sprung up on one or other of the headlands rising high above the stream, has hitherto remained almost uninhabited. The Red River must be ascended some considerable distance before any large towns are met. Such is *Alexandria*, which lies 150 miles above the confluence, near some rapids, by which the navigation of large steamers is completely arrested. Alexandria, which is the centre of a rich tobacco-growing district, also forwards cotton, rice, fruits, and sugar.

Below the confluence are still seen the remains of *Port Hudson*, which, after a short resistance, was surrendered to General Banks on July 9, 1863. About 22 miles below Port Hudson follows the village of *Baton Rouge*, which takes its name from a "red staff," or symbol of war, found here by the French pioneer explorers. It stands 25 feet above high-water mark on the southernmost of the bluffs commanding the left bank of the Mississippi; but the low headland with its rounded crest differs altogether from the bluffs higher up, whose ravined escarpments rise abruptly above the stream. Thanks to its healthy climate and central position, Baton Rouge was selected as the state capital in 1847, and has since continued to enjoy this honour, except for some time after 1864, when the seat of government was temporarily removed to New Orleans.

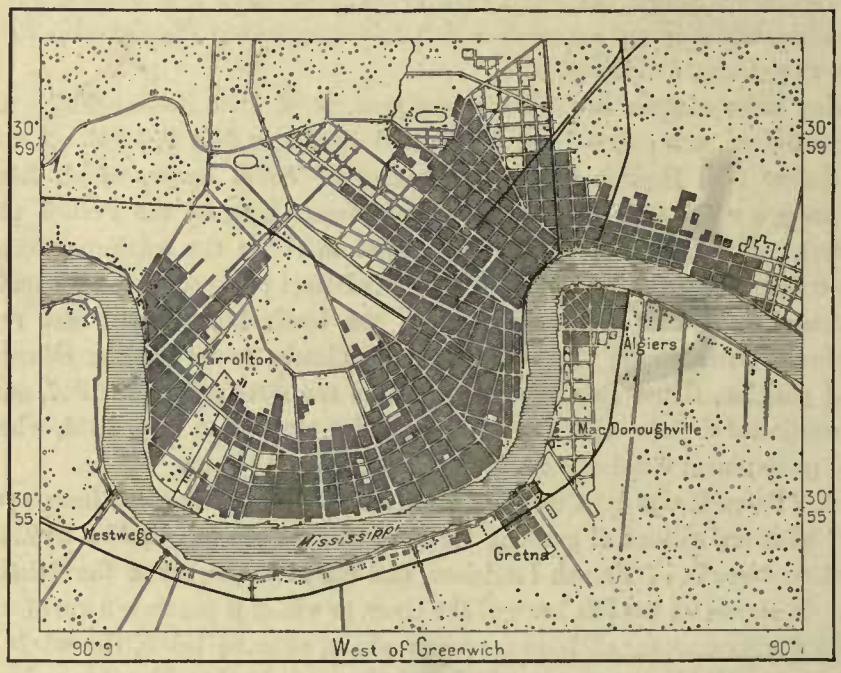
Below Baton Rouge both banks of the river are lined with a continuous succession of planters' villas and gardens for 125 miles all the way to *New Orleans*, the ancient metropolis of French Louisiana, and the great seaport of the Mississippi basin. It stands on the left bank of the river, to which it presents a vast frontage with its double crescent of houses, convex above, concave below, the whole comprising several towns or quarters which have been gradually soldered together for a space of about 12 miles. Yet the position seemed far from favourable for the site of such a huge agglomeration of structures. Although it stands about 100 miles above the mouths of the Mississippi, the ground has scarcely more than a mean elevation of 10 feet, while in the suburbs lying farthest from the river the low spongy soil stands almost at sea-level. Before 1727, when still unprotected by any embankments, New Orleans was periodically flooded, and the isthmus separating the fluvial waters from those of Lake Pontchartrain almost disappeared during the inundations. Thanks to the completion of the embankment works, begun over 150 years ago, New Orleans has ceased to be amphibious. A magnificent levee over a hundred yards wide protects it for a distance of about 12 miles towards the river, while powerful steam engines are continually at work pumping up the rain or surface waters and discharging them through a broad drain or channel into Lake

Pontchartrain. Most of the houses are slightly constructed of wood or brick, while the public buildings, heavily weighted by their elevation and stone, granite or marble facings, rest on piles sunk to a depth of 25 or 30 yards below sea-level. The sediment deposited by the current along the convex section of the lower curve of the city continually broadens the shelving frontage, thus leaving more and more space for the construction of new streets. But the reverse process is in operation higher up, where the concave front of the Carrollton suburb is exposed to such extensive erosions that a whole quarter has had to be abandoned.

Although the normal plan of New Orleans resembles that of most other North American cities, the double bend of the river frontage has interfered with the

Fig. 153.—New Orleans.

Scale 1 : 150,000.



* Lighthouse.

2½ Miles.

usual rectangular development of the streets from one extremity to the other. Thus the "French quarter" occupying the region of the lower crescent has assumed the form of a series of trapezes separated by boulevards, and turning their smaller base towards the stream. On the other hand, the northern suburbs of Lafayette, Jefferson, and Carrollton, occupying a semicircular peninsula of the Mississippi, present their broader base to the current, while the intervening boulevards converge at a point on the skirt of the forest in the middle of which the settlement was originally founded. These northern quarters are the more elegant and fashionable, and are surrounded by ornamental grounds, where the atmosphere is heavy with the fragrance of the jasmine, orange, and magnolia. The busy manufacturing towns of *Algiers*, *MacDonoughville*, and *Gretna*, facing New Orleans on the opposite

side, must also be regarded as outskirts of the great city. They stand on low-lying riverine tracts formerly overgrown with cypress groves, afterwards cleared and reclaimed by a costly system of embankments.

Apart from the spongy character of the soil, the great southern emporium occupies an admirable commercial position, and Bienville showed no little foresight when in 1717 he erected on this spot the first log-hut of the future city. Standing at a certain distance from the delta, though still near enough to the point where the stream ramifies into several branches, the city controls both the inland and foreign trade of the country, and has become the natural exchange for all the produce and products of a vast region. Commanding the narrowest part of the isthmus between the river on one hand and lakes Pontchartrain and Borgne on the other, it enjoys the twofold advantage of land and sea communications. It is thus both a riverine port through the Mississippi, and a seaport through the channels connecting it with Lake Pontchartrain. This inlet, however, is visited only by vessels of light draught, so that nearly all the sea-borne traffic is carried on through the harbour formed by the lower crescent. Here the quays, encumbered with bales of cotton, hogsheads of sugar and other wares, are lined with a triple or quadruple row of palatial steamers. The stream is alive with craft of every description, large steamers crossing each other in all directions, small tugs taking huge three-masters in tow, steam ferries continually gliding to and fro. The trade of Louisiana with the northern and central states is carried on almost exclusively by steam. After the cotton crop is garnered and the first freshets have floated the steamboats taking in their cargoes at the ports of the various Mississippi affluents, as many as fifty of these leviathans may be seen descending the river in a single day, laden with three, four, or even five thousand bales of cotton. Steam controls all the traffic of the great river above the city, where small sailing craft have become rare, while the unwieldy "Noah's Arks," roughly put together with huge beams and planks, are now freighted only with the oils of the Ohio basin and taken to pieces at the end of the voyage. New Orleans receives from the Central and Northern States enormous quantities of agricultural produce, and is also a great depot for the sugars, bananas, and other tropical products from Central America, Cuba, and the other West Indian Islands. As a forwarder of cotton she holds the first rank, employing no less than 100,000 persons in this business. But she takes only a slight share in the import trade of manufactured wares, while her own cotton spinning industry is still but little developed. The heavy charges incurred by the high railway freights and for the storage of bonded goods have diverted from New Orleans a great part of her traffic. The movement of the exchanges also naturally takes the more direct route from the Mississippi valley to the Atlantic seaports for Europe. Recently the largest house of business in the south has even proposed to found a new city on the very mud-flats at the mouth of the river, with all the incidental harbour works, floating docks, railways, and a staff of assistants more manageable than the citizens of a large emporium. Such an undertaking might have seemed chimerical a few years ago; but almost anything seems possible since commercial syndicates

dispose of revenues equal to those of great states. There is nothing to prevent the artificial islet of *Port Eads* from being enlarged, formed as it has largely been by the ballast of vessels crossing the bar.

New Orleans has suffered much from yellow fever; no other city of the United States having been so frequently decimated by this scourge, which first made its appearance from the West Indies in the year 1699. In 1853 the epidemic carried off a twentieth of the normal population, although one-half of the inhabitants had fled from the plague-stricken spot. But since the Civil War better sanitary arrangements have greatly improved the health of New Orleans.

In the vast region of the delta the only centres of population are a few obscure villages in the midst of the plantations, and some fishing hamlets and watering places along the sea-coast and on the neighbouring islands. Two military posts are seen facing each other at a bend of the river. These are *Forts Saint Philip* and *Jackson*, the latter so named in honour of the general who defeated the English in 1815 at the battle of New Orleans. In the southern parts of Louisiana the districts traversed by the Atchafalaya, Tèche, and Vermillon bayous, and bearing the names of the now extinct Opelousa and Attakapa tribes, described as "peaceful anthropophagists," are still inhabited by communities of French or Franco Canadian origin, who still speak the language of their forefathers.

The territory of the Attakapa Indians, a stretch of magnificent prairies, is the region where Law, director of the famous "Compagnie du Mississippi," had proposed to settle six thousand Germans from the Palatinate. Farther on in the direction of *Natchitoches*, the district formerly occupied by the industrial and trading confederation of the Caddo nation is now peopled by Spanish half-breeds, for the most part "Cowboys," associated with Italian immigrants.

Lastly, in the parish of Saint Bernard, the population consists to a large extent of the so-called Islingues, that is, Isleños, or "Islanders," descendants of the Canary Islanders introduced into the colony by governor Galvez at the end of the last century. In the same neighbourhood dwell the "Gens de Manille," that is, Spaniards and Tagals who arrived about the same time from the Philippine Islands. Spanish is still current in this part of Louisiana.

The numerous inlets indenting the coast along both sides of the Mississippi delta are too shallow to give access to any larger craft than sloops and smacks engaged on the oyster grounds. Nevertheless the little port of *Morgan City*, near the mouth of the Atchafalaya, trades directly with Vera Cruz, thereby avoiding the long detour by one of the Mississippi mouths. Morgan City is the port of entry of St. Mary's parish.*

22.—Texas.

The name of Texas is said by some writers to recall the cry of *Tejas, Tejas*, that is, "Friends, Friends," with which the Asinai-Indians received the Spaniards on their first arrival in the country. This state, which has a larger superficial area than any other in the Union, occupies a space between the Rio Grande, the

* Louisiana retains the old French administrative divisions into "parishes," which correspond to the "counties" of the other Federal States.

Sabine, and the Gulf of Mexico, larger by many thousand square miles than the whole of France, in fact, within 3,000 or 4,000 square miles as large as France, England, and Wales collectively. Hence during the long struggle between the Northern abolitionists and the Southern pro-slavery party, the latter often proposed to divide this region into five states, so as in this way to increase the number of democratic senators, and thus secure a definite majority in the Upper House. But Congress always rejected the project, and Texas has preserved her ample domain except at the north-west corner, where vast tracts have been ceded to the Federal Government as public lands. In the north, however, the frontiers have not yet been accurately determined. In 1891, the district of Greer county was claimed both by Texas and Oklahoma Territory. Texas is conterminous with New Mexico on the west, Oklahoma and Indian Territory on the north, Arkansas on the north-east, and Louisiana on the east side. Elsewhere its limits are the Republic of Mexico on the south-west, the dividing line being the course of the Rio Grande del Norte, and on the south the Gulf of Mexico, with about 400 miles of a monotonous coast-line.

Early in the eighteenth century the Spaniards, advancing from Mexico northeastwards, began the settlement of the "New Philippines," as the province was then named. But this region had also been claimed by the French as part of their colony of Louisiana, and its possession long continued to be a subject of discussion between the two powers. When Louisiana passed, in 1803, to the United States, the French claim was inherited by the young republic, and maintained especially by the southern states, from all parts of which adventurers began at an early date to find their way across the ill-defined frontiers. These were at last determined in 1819, when the Sabine River was accepted as the eastern limit of the Texan province of Spanish North America. But the arrangement satisfied neither party, and the political rivalry, intensified by racial antipathies, led to a sort of unofficial warfare in 1835, attended by cruel butcheries and sanguinary reprisals, where there was little to choose between the lawlessness of the Anglo-American and the treachery of the Hispano-Mexican combatants. The massacres of Alamo and Goliad were followed by Houston's victory on the San Jacinto River, and by the capture of the Mexican President, Santa Anna, who had entered Texas with a considerable force for the purpose of reducing the turbulent English-speaking settlers. These, however, were now everywhere triumphant, and forthwith declared Texas an independent republic (1842), looking for support from the Washington Government on the tacit understanding that the new republic would eventually enter the Union as a federal state or territory. Thus was prepared the way for its annexation in 1845, a step which was resented by Mexico and followed by the war of 1846, leading to a further dismemberment of that country, and to the official recognition of the Rio Grande as the south-western boundary of the conterminous powers. In 1850, the state of Texas was reduced to its present limits, by the surrender of all claims to other lands lying beyond these limits, receiving in compensation a sum of $10,000,000 from the Federal Government. Having seceded with the slave states

in 1861, Texas was not readmitted to representation in Congress till the year 1870. Since then general peace has been maintained, disturbed only by local troubles with Mexican outlaws and desperados. The title of the "Lone Star State," long borne by Texas, had reference to the solitary star shown on the flag of the "independent republic" before its admission to the Union.

A state of such vast dimensions naturally presents a considerable diversity of soil, and to some extent even of climate. The terraced lands which follow in ascending order from the shores of the Gulf to the plateau of the Staked Plain form in this respect so many distinct zones. At varying distances from the coast begins the belt of dried and fertile tracts suitable for the cultivation of every variety of semi-tropical plants. The river bottoms descending from the north-western uplands prolong in that direction the cotton and grain-growing region. Farther on the other less fertile terraced plains are scarcely adapted for anything except stock-breeding. This is the region of the so-called *ranchos*, cattle or sheep runs, often many thousand acres in extent. Beyond it, in the direction of the north-west, the grassy steppe merges gradually in arid wastes, stony deserts and saline depressions. Texas, foremost state in the Union for its live-stock, also takes the first place in the production of cotton. Mississippi had long maintained its pre-eminence in this respect, despite the far larger extent of land available for cotton cultivation in Texas. Since the year 1887, however, the latter state has outstripped all others, not only for the actual area under cotton, but also for the quantity of fibre yielded by the plantations.

Although till comparatively recent times forming an integral part of Mexican territory, Texas is almost exclusively inhabited by populations of English speech, at least throughout the eastern and central districts. Spanish settlers were at no time numerous enough to maintain the balance against the rush of immigrants from all parts of the Union, and especially from the southern states, which began about the year 1812. Nevertheless, colonists of Spanish speech are concentrated in the western districts, and particularly along the banks of the Rio Grande. Several towns, and in the Anglo-American cities, several quarters inhabited by Hispano-Mexicans, still retain their primitive aspect. In a social and ethnological sense, Mexico may, in fact, be said to extend for some considerable distance beyond the Rio Grande frontier. The French, who were the first to found settlements in Texas under La Salle in the year 1686, are no longer represented in this state in separate communities. On the other hand, a few towns have been founded by the Germans, who have recently immigrated in considerable numbers. The blacks originally introduced as slaves to the planters, still reside in the same districts, and are numerous, especially in the southern and eastern parts. But the original inhabitants of the country—Caddo, Comanche, Apache, Navajo, and other Indian tribes—have either disappeared, or are confined to the hilly regions of the west, mainly between the Pecos and Rio Grande.

In the eastern part of the state, the oldest, though one of the least progressive towns, bears the name of the extinct tribe of *Nacogdoches* Indians. It lies 175 miles north of Galveston on the old trade route between Louisiana and Mexico.

In this north-eastern region of Texas the most important place at present is *Marshall*, a converging point of numerous railways above the lakes traversed by the Red River, and also a great cattle and grain market. Marshall, which lies 30 miles west of Shreveport and 16 miles south of Jefferson, is the seat of the Wiley University (Methodist Episcopal), founded in 1837. *Texarkana*, at the north-east

Fig. 154.—Valley of the Rio Grande del Norte.

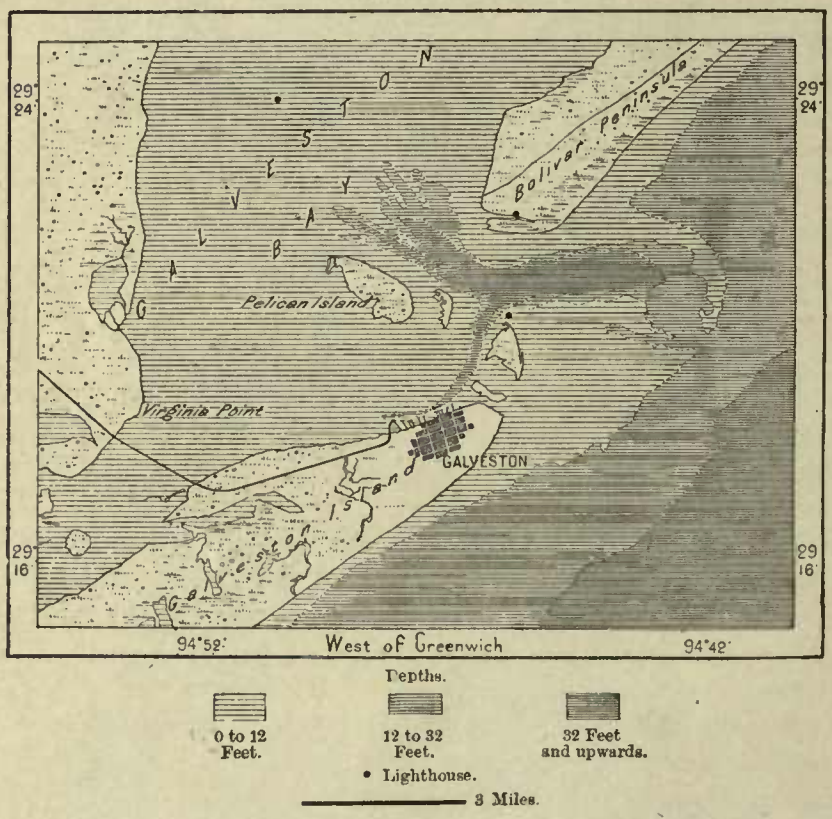
corner of the state, lies partly in Arkansas, whence its whimsical name, which has been formed from those of the two conterminous states, Texas and Arkansas. The valley of the Trinity River, which follows west of the Neches and Sabine basins, is one of the most thickly peopled districts in the state. *Dallas* is the most flourishing place in the upper Trinity valley and is the most populous city in the whole

of Texas; it lies about a mile below the West Fork confluence, and besides its importance as an agricultural centre has already developed several industries, such as foundries, woollen and soap factories. *Fort Worth*, which despite its name is no longer a military station, stands 30 miles to the west of Dallas, on the west fork of the Trinity.

Galveston, on an island at the mouth of the Trinity River, 290 miles west by south of New Orleans, was at one time the most populous city in Texas; but it has already been outstripped in this respect by Dallas and San Antonio, despite the convenient position of its spacious harbour on the Gulf of Mexico. Galveston,

Fig. 155.—Galveston.

Scale 1 : 230,000.



so named from the Mexican planter, Galvez, stands at the east end of the sandy island (formerly called Snake Island) which has been built up by the surf and marine currents as a sort of breakwater at the entrance of Galveston Bay, an inlet 35 miles long by 12 to 15 broad, with about 14 feet of water on the bar at ebb tide. The bar or submarine bank connects the low-lying island with another strip of sands closing the bay on the east side. The entrance thus formed is further narrowed and somewhat endangered by a few islets dotted over the intervening space. Nevertheless the harbour is by far the best on the Texan coast, and Galveston has consequently almost monopolised all the sea borne traffic of the

state. Cotton is almost the only article of export, while coffee and fruits are the chief imports. A viaduct some miles long, carried over the shallow channel between Galveston Island and the mainland, connects this seaport with the continental system and with the lines converging on the flourishing inland city of *Houston*. This place, which was founded in the same year (1836) as Galveston, serves as its forwarding depot for the produce of the Trinity and Brazos River valleys. Houston is distant by rail 50 miles north-west from Galveston, and stands on the Buffalo bayou, which is navigable to this point by steamers of light draught. During the early days of Texan independence, Houston was the capital of the republic; hence its frequent mention in the records of those turbulent times.

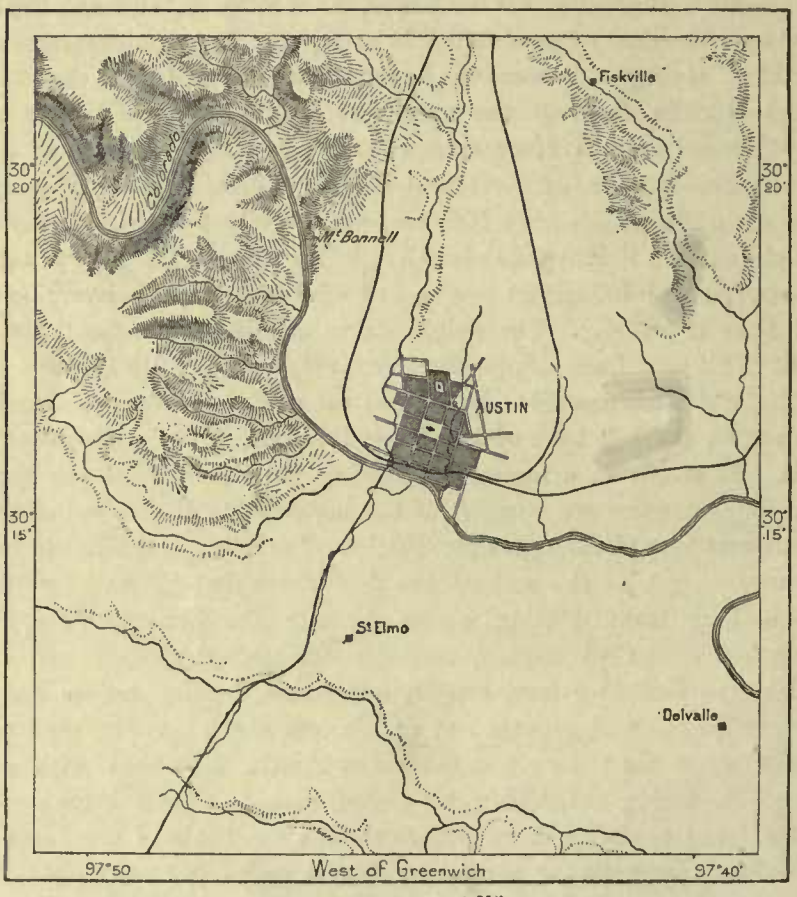
Although the Brazos basin is the largest in the state, and although it yields the best and most abundant crops of cotton, it has scarcely any populous towns along its river banks. Owing to the want of a harbour at its mouth, for the exposed *Velasco* roadstead scarcely deserves the name, the stream of traffic has been almost entirely deflected towards Houston and Galveston. *Fort Belknap*, on the upper course of the river 105 miles north-west of Fort Worth, lives on the prospects of its vast coalfields, which have hitherto been scarcely touched. Meanwhile the largest place in the Brazos valley is *Waco*, which lies on the west or right bank of the river, about 100 miles north by east of Austin, at the converging point of several lines of railway. The neighbouring artesian wells yield good water, sufficient to fill some large fish-ponds after supplying all the local wants.

Austin, which has succeeded Houston as the capital of Texas, lies more to the south-west, on the left bank of the Colorado River, 78 miles north-east of San Antonio. It stands on a terrace overlooking the stream from the north, and commanding an extensive prospect of the surrounding plains, bounded towards the north-west by a picturesque hilly district. For a long time Austin had little importance, except as the seat of the legislature, but in recent years it has become a busy manufacturing centre, drawing the raw materials from the neighbouring cotton plantations, from its well-stocked ranchos and extensive mineral stores, including iron, copper, manganese, besides granite and marble quarries, and deposits of gypsum and argillaceous clays. A dam constructed at this point across the Colorado supplies the Austin workshops with a motive power, which, during the high-water season, exceeds 14,000 horse-power. An iron mine, lying to the north-west of Austin, on the banks of the Llano affluent of the Colorado, presents the curious aspect of a wall rising not more than 15 or 16 feet above the ground for a distance of about 500 yards, with a mean breadth of 290 yards. But the surveyors have not yet ascertained to what depth descend the foundations of this remarkable rampart, over two-thirds of which consist of pure metal. Austin is accessible during high water to small steamers from the port of *Matagorda*, at the mouth of the Colorado. This place would become the natural outlet for the products of Austin were it possible to improve the approaches, which are at present obstructed by shoals and sandbanks. Vessels of light draught are alone able to surmount the bar, which is probably the same that Cavelier de la Salle crossed during his last and fatal expedition of 1686. The

fort of Saint Louis, erected by him on this occasion, could scarcely have been very far from the present village of *Indianola*, on the west side of Matagorda Bay.

San Antonio de Bexar, on the river San Antonio, 210 miles directly west of Galveston, is one of the oldest places in North America, dating from the beginning of the eighteenth century. It has preserved its old Hispano-American name, and even its population, which gives it the rank of second city in the state, is still partly of Spanish origin and speech. The "Dust City," as it is called, is nevertheless traversed by several little watercourses dividing it into a number

Fig. 156.—Austin.
Scale 1 : 200,000.



of distinct quarters. Such are, in the centre, the "old town," or San Antonio properly so called, chiefly devoted to business; the Mexican quarter in the west, and the German in the east. The latter element, however, does not enjoy the numerical preponderance, as it does in the German settlement of *New Braunfels*, on the Guadalupe River, 30 miles north-east of San Antonio, on the road to Austin. San Antonio, which enjoys the advantage of extensive water-power, has become a considerable industrial centre, with several breweries, tanneries, flouring-mills, and other factories; it is the last great centre of population in the

south-western part of the state, while the military headquarters are stationed at the neighbouring Fort Sam Houston. The city itself occupies the site of Fort Alamo, famous in the records of the desultory warfare long maintained between the rival Anglo-Saxon and Hispano-American populations.

Along the course of the Rio Grande all the settlements are double, an American on one side facing a Mexican on the opposite side of the stream. Such are the two *El Pasos*, the two *El Presidios*, *Eagle Pass* and *Piedras Negras*, the two *Laredos*, *Rio Grande City* and *Camargo*, *Hidalgo* and *Reinosa*, *Brownsville* and *Matamoras*. The wooden houses of the Texan correspond to the adobe or sun-dried brick structures of the Mexican side; thus everything contrasts on either bank of the river. *Brownsville*, the most noted of all these places in the history of the local wars and revolutions, forwarded enormous quantities of cotton to England by the Mexican route during the War of Secession. It lies about 35 miles above the mouth of the Rio Grande on the site of *Fort Brown*, where the Mexicans were repulsed in May, 1846. *Rio Grande City*, about 100 miles higher up, stands at the head of the steam navigation on the river from which it takes its name. The Texan *Laredo*, opposite the Mexican Nuevo Laredo, lies about 150 miles to the south-west of San Antonio. In general, the American are smaller than the Mexican towns, being mostly merely outlying stations guarding the frontiers towards the conterminous republic.

CHAPTER VII.

THE ROCKY MOUNTAINS AND THE PACIFIC SLOPE.

I.—Relief of the Land.

VIEWED as a whole the Rocky Mountains orographic system offers, in its United States section, the general aspect of a broad plateau, describing a convex curve parallel with the Pacific coast-line, and presenting a similar convex aspect towards the plains of the Mississippi slope. It has thus a rough elliptical form, bulging out east and west in its central part, and narrowing somewhat rapidly north and south towards the Canadian and Mexican frontiers. Under the 49° latitude, coinciding with the northern political frontier, the Rockies are scarcely more than 300 miles wide from base to base, whereas, at their greatest width, between Cape Mendocino and Denver, the space enclosed by the two outer scarps of the plateau approaches 1,000 miles in breadth. Farther south, it again gradually contracts, as does the continent itself, which forms its pedestal. In its general trend, the plateau also follows the normal direction of the two divisions of the New World, being disposed not due north and south, but with an inclination of about 20 degrees to the west of the central meridian. Thus the Rocky Mountains system, compared with that of the Appalachians, seems, like that of the South American Cordilleras, to constitute the true backbone of the northern continent. In fact, both the Andes and the Rockies were formerly regarded as constituting a single orographic system, and at the beginning of the present century, the very word "Andes" was one of the names most frequently applied by geographers to the Rocky Mountains. These uplands cover a superficial area vastly greater than those corresponding to them on the Atlantic side of the Union, the space occupied by the Pacific ranges and plateaux being estimated at about 1,000,000 square miles, or considerably more than one-fourth of the whole republic. The Rockies have also a far greater mean elevation than the Appalachians. The plateau itself, which bristles with their innumerable peaks, stands some 5,500 feet above sea-level, which alone exceeds the average altitude of the eastern ridges. The two main border ranges of the western system, that is to say, the Cascade Mountains, forming a northern continuation of the Sierra Nevada towards the Pacific, and on the Mississippi side, the various

crests more specially bearing the name of the "Rocky Mountains," have numerous summits 13,000 or 14,000 feet high, or about twice the altitude of the loftiest Appalachian peaks. The axis of greatest elevation intersects at right angles the longitudinal axis of the whole system; it runs from Mount Lincoln to Mount Whitney, passing north of the Grand Cañon of the Colorado River.

The North-eastern Border Ranges.—The Yellowstone Park.

Within the limits of the United States the northern section of the Rocky Mountains, properly so called, continues the Canadian range with no breaks beyond a number of passes with a mean height of from 6,000 to 7,300 feet. Here the chief peaks, exceeding 7,400 feet, are disposed along an extremely sinuous axis with a general south-easterly trend. In the immediate vicinity of the Canadian frontier the so-called "Boundary Pass" stands at a height of 7,350 feet. Every group and ridge has its special name, one of the best known being the Big Belt Mountains, applied especially to the range rising to the south of the Missouri gorge. Farther on in the same direction the Yellowstone, another copious stream, also forces its way through the outer chain of the Rockies.

It is a remarkable fact that the first white explorers, guided by the Indian trappers, all crossed the great divide in the northern part of the range, and not by ascending the course of the great rivers, which would have led them directly to the wonderland of geysers and thermal waters. They were deterred from following the more southern route by the savage defiles piercing the ranges, and the long tracks winding through a labyrinth of upland valleys and inner cirques; hence they preferred the northern routes, where the chief ridge of the Rocky Mountains contracts to a comparatively slight width between the two continental slopes. Here also the granite domes, the Silurian and Devonian escarpments, present relatively gentle inclines, without the rugged aspect characteristic of the steep rocky walls between which the Missouri and its affluents have forced their way to the plains. The North Pacific trunk line crosses at Mullan's Pass by a tunnel 3,850 feet long at an elevation of 5,550 feet.

South of the Yellowstone gorge the "Montagnes de Roche," as they were originally named by the Franco-Canadian voyageurs, ramify into several ranges of varying size and irregular trend with a breadth from east to west of altogether over 180 miles. The Big Horn Mountains, as the eastern ridge is called, develop a crescent of about 120 miles, back of which rise all the great Yellowstone affluents of the Missouri; here also follow the successive ramparts of the Snow, Shoshone and Wind River Mountains, the Teton and Snake River Ranges, all resting on the vast pedestal of a common plateau. These lofty ranges, composed of granites or paleozoic rocks with huge masses of basalts and trachytes cropping out here and there, exceed 8,000 feet, with peaks towering 3,000, 4,000, or even 5,000 feet above the normal elevation. Owing to its hot springs, geysers, lakes, and waterfalls, this region of the American Alps has become so famous that many of its dominant summits have acquired a distinct individuality in the eyes of travellers Such is Monument Peak, so named because it presents the aspect of an imposing

edifice with colonnades and buttresses erected on the Big Horn range; such also is Cloud Peak (13,540 feet) in the vicinity of which the surveyor, Johnson, lately discovered a glacier five miles long, discharging its terminal crystal blocks into a little lake three-quarters of a mile from the shore. From the top of a frontal wall a stone may be dropped 1,000 feet into the waters of the basin below.

Fig. 157.—Yellowstone Lake and the Geysers.

Scale 1 : 800,000.

Within the limits of the Yellowstone National Park there stand out conspicuously several towering summits, such as the volcanic cone of Mount Washburne (11,520 feet), close to the Great Falls; Bell's Peak (10,360 feet), and Mount Holmes (10,700 feet). South-west of the park, amid the deep troughs where flow the headwaters of the Columbia, follows in a line the rugged serrated range of the three Tetons, step pyramids of nearly like form, the loftiest of which (Hayden

Peak, 13,833 feet) stands at the southern extremity of the range. East of this imposing rampart Union Peak, somewhat less elevated than its neighbours, stands on the continental divide, discharging its running waters on one side through the Wind River to the Missouri and the Gulf of Mexico, on the other through the Grosventre Creek to the Snake or Lewis Fork of the Columbia for the Pacific Ocean. Farther south, Fremont Peak (13,570 feet), another giant of the Rocky Mountains, towers above the crest of the Wind River range at the sources of the Green River affluent of the Colorado. But beyond this point the crest falls rapidly and branches into divergent ridges, one of which terminates southwards in the superb pillar of Rock Independence on the northern verge of the elevated Laramie plains, themselves 7,500 feet above sea-level. At its foot winds the old track followed by the emigrants, now abandoned for the transcontinental railways. The hieroglyphics or rude pictures painted by the Indians on the face of this rock have long been obliterated by the names of white travellers carved over them. The Wind River Mountains, which are swept by the storms and blizzards of both slopes, received from the Franco-Canadian trappers the name of "Monts Ouragon," a designation which, under a slightly modified or Anglicised form, has become that of the state of Oregon.

Volcanic ejections have strangely modified the outlines of the mountains piled up confusedly in the National Park and surrounding district. Cones of igneous matter have sprung up in the very centre of old lacustrine basins, or on the slopes of the encircling hills. Elsewhere molten masses of trachyte, injected into the fissures of the rocks, have resisted the weathering process, while the enclosing walls have since disappeared, eaten away by erosive action; and now the harder masses stand out in the form of isolated pinnacles or buttresses, rising like the ramparts of a citadel some 120 feet high above the prairies or the woodlands. In one place the lava-fields terminate abruptly in rugged cliffs; in another they have been as if suddenly congealed while flowing like running waters, and are now spread out over a broad surface almost as smooth as that of a tranquil lake. Sheets of solidified obsidian are very common, and nowhere else present more the appearance of artificial glass in their delicacy of texture and transparency. In order to cut tracks across the rougher masses of obsidian large fires are kindled, and when expanded by the heat jets of cold water are thrown upon the blocks; this has the effect of instantly shattering them into innumerable fragments, which are then easily brushed aside. An obsidian cliff near the Gardiner River, a southern affluent of the Yellowstone, is over 160 feet high, and assumes the aspect of superb colonnades of a shining black colour streaked here and there in red and yellow. In many places the lavas have flooded whole forests, which are now found petrified in their stony encasements. The Amethyst Mountain, north-east of the lake, is full of such fossil trees, amongst which have been recognised magnolias, lindens, elms, and the ash, but no conifers, although the pine and spruce are at present the prevailing species.

The volcanic plateau, the centre of which is flooded by the Yellowstone Lake, is a mountainous region standing at a mean elevation of 7,500 feet, overgrown

with vast pine and spruce forests stretching beyond the horizon, and dominated by cones which rise 2,000 or 3,000 feet above the normal level, and which are snow-clad for the greater part of the year. No lavas or ashes are any longer ejected from the craters of these cones; but the underground energies are still revealed by frequent earthquakes and by the countless jets of thermal springs. On the shores of the lake, and lower down in the Yellowstone River valley, these springs are distributed in groups, some edged with sulphur margins, some throwing up streams of mud from their orifice, while others deposit on the surface their incrustations of silica; here and there geysers also escape from the bowels of the earth with a hissing sound. In the Yellowstone National Park there have been enumerated altogether over 2,000 large springs or jets, 71 of which discharge intermittent columns of vapour and water.

Most travellers approach the National Park through the region where the Yellowstone River tumbles over magnificent cascades in its tumultuous course through the grand cañon. In the neighbouring valley of the Gardiner, which descends from the slopes of Mount Washburne, the hillsides have been clothed with dazzling snow-white incrustations deposited by numerous thermal springs bubbling up amid the cones of extinct geysers. The lime with which the water is saturated is derived from the layers of carboniferous limestone underlying the more recently erupted basalts. The Mammoth Springs, as the chief fountains are called from the grandeur of their phenomena, flow from the slope of a mountain, but in such a way as to form, from cascade to cascade, a series of lovely little basins disposed in semicircles, and girdling the cliff for a space of about 1,000 feet. Each basin is flooded with water of the clearest azure, the overflow of which falls in thin sheets over the sparkling rim, which seems wrought in waving patterns of the most delicate lace or beadwork. The temperature of the springs varies greatly, some being tepid, others scalding hot; even on the same terrace some boiling jets disappear in wreaths of vapour, while the pure crystal flood of other basins is unclouded by a single puff of steam, and so pellucid as to reflect the slightest speck floating overhead. Many-coloured algæ, red, yellow, or green, float on the surface of the cooler basins, contrasting with the blue liquid or the spotless white margins.

Even in the very middle of the Yellowstone Lake the underground springs welling up in the lacustrine bed have gradually built up their cones of calcareous or silicious deposits, until the incrustations have reached and risen above the surface. Thus have been formed little terraced "atolls," where the angler can take his seat on the steps of the rim, and transfer his captured trout from the almost icy waters of the lake to the boiling caldron of the rocky islet.

But the most curious district on the volcanic plateau is that traversed by the Firehole, main branch of the Madison, some 18 or 20 miles west of Yellowstone Lake. In no part of the world, not even in Iceland, where are found the types of geyser phenomena, and which has given them their names, is seen such a concentration of bubbling or spouting springs, remarkable alike for their volume and amazing variety of form. From one of the heights commanding the Firehole

THE MAMMOTH TERRACES, YELLOWSTONE NATIONAL PARK.

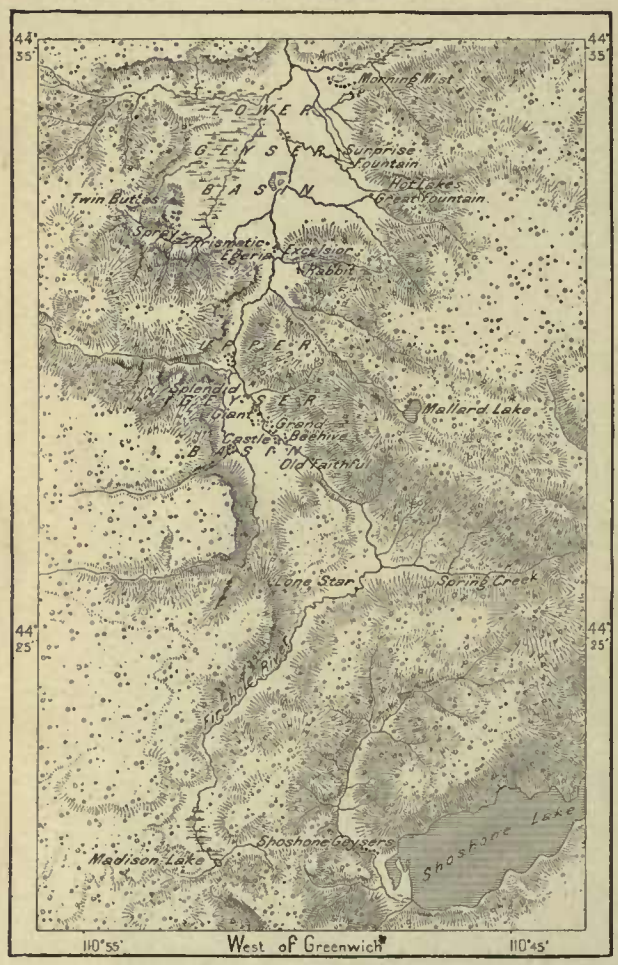
valley the observer may embrace at a single glance hundreds of springs, geysers, or mud volcanoes lining the banks of the torrents. The Americans, who are fond of hyperbole, have been puzzled to find adequately descriptive terms for these stupendous spectacles. Here is seen the "Grand Geyser," who awakens from his slumbers at intervals of thirty-two hours, each eruption being preceded by premonitory underground rumblings like the roaring of an angry sea. Suddenly a huge column of water, about seven feet in diameter, is seen to rise and rise higher and higher, not continuously, but fitfully by spurts and starts, to a height

Fig. 158.—Yellowstone Lake—Fishing and Cooking.

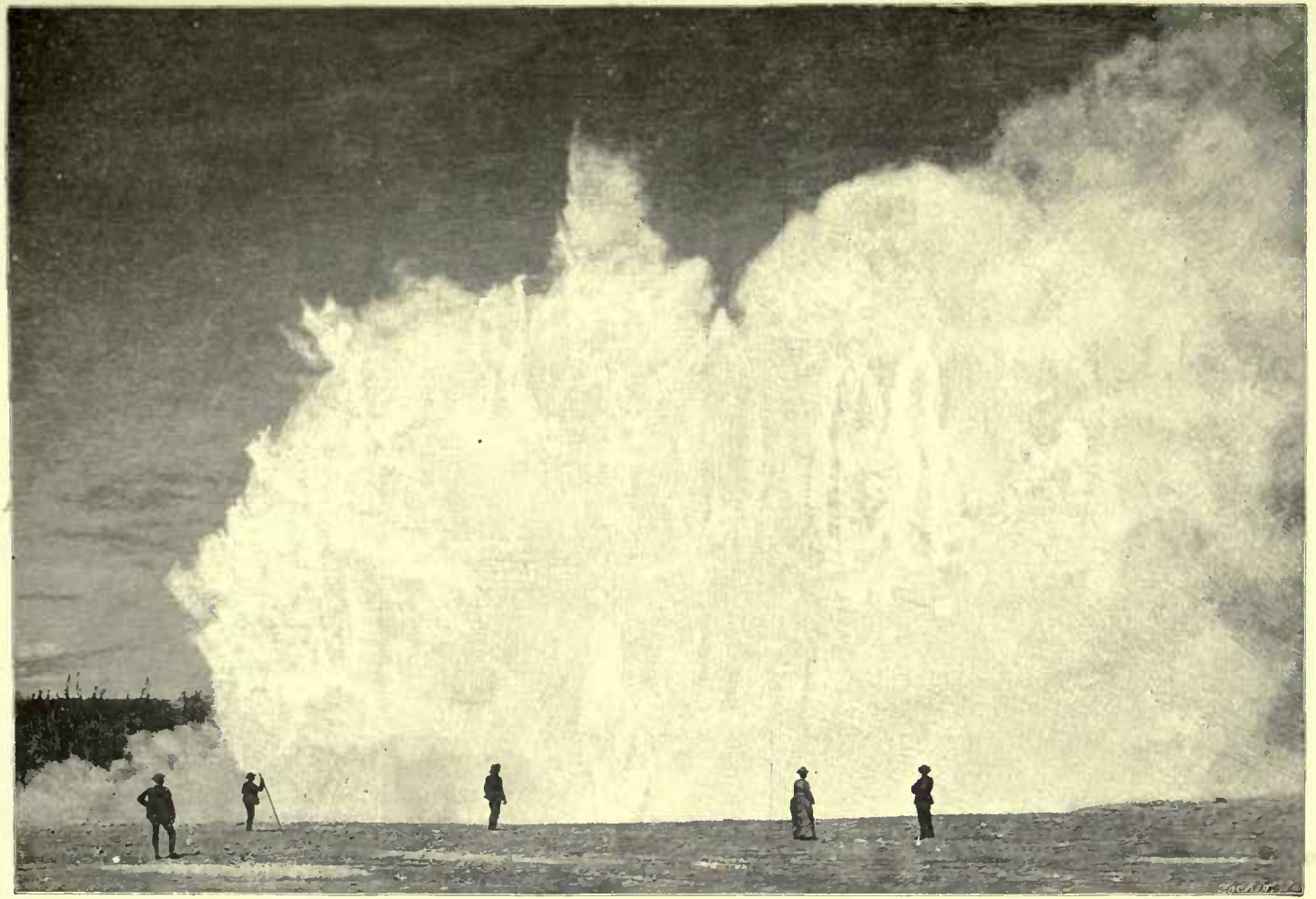
of at least 140 feet, while the vapour unfolding itself in long wreaths ascends over 650 feet into the air. But, however imposing it may be, the Grand Geyser still has rivals in this land of wonders. It is flanked north-west and south-east by the "Giant" and "Giantess," of which the former throws its jet to a height of 150 feet, and maintains it for nearly three hours. Although the central column of the "Giantess" rises only about 40 feet, its lateral jets dart up like rockets to the tremendous height of 250 feet. The "Excelsior," which till the year 1880 was regarded merely as a tranquil thermal spring, has suddenly revealed itself as the

most vigorous of all the geysers. Its vertical column, 200 feet in circumference, has been seen to rise to a height of 300 feet, carrying with it blocks of stone and débris mingled with clouds of vapour; long after each explosion a dense fog envelops the valley. The "Monarch" is also one of the most potent of the geysers, while "Old Faithful," a little south of the "Giantess," deserves its name by the punctuality with which its explosions with their warning mutterings regularly return every hour. The "Beehive" develops its rounded crest in a superb oval, while the "Fan," altogether of unique form, consists of two jets discharged from two pipes obliquely inclined towards each other, so that the columns of water collide in the air, the clash causing them to merge in a spacious dome with divergent jets. Lastly, the "Blood Geyser," charged with a diluted red clay from its crater, covers the ground with sanguineous rills which intermingle with the waters of the Firehole, polluting its current.

Fig. 159.—Firehole River Valley.
Scale 1 : 240 000



At the same time the descriptions given by the different observers of these famous spouters vary from year to year, and from season to season, according to the abundance of water and the state of the temperature. Frequent displacements even occur, and while certain springs have developed into geysers, some of the latter have been reduced to tranquil pools by the collapse of their underground galleries. Craters which formerly ejected great columns of water are now clothed with verdure, and the calcareous or silicious incrustations mixed with vegetable humus become fissured by the expansion of the roots of conifers embedded in the soil. Since the discovery of this "Wonderland," a certain diminution of energy seems to have been observed in its manifestations of underground



EXCELSIOR GEYSER, YELLOWSTONE PARK.

activity. Certain geysers, such as the "Giantess," are in process of extinction, although there are others which are growing more vigorous and powerful. All the intermittent springs are situated near the banks of streams, affluents of the Madison, the Yellowstone, or Shoshone Lake. Hence it is surmised that their supply of water is derived. not from underground reservoirs, but from the infiltrations of the neighbouring rivers, which becoming heated by contact with volcanic rocks, in the cavernous recesses of the ground, escape in the form of condensed vapours. "Fireholes," that is, fissures discharging hot steam, occur in the very bed of the stream, which from them takes the name of the Firehole River. Certain mounds in the form of excrescences, either scattered over the ground or disposed in a line, also discharge along the bank of the torrents streams of many-coloured mud, red, yellow, or blue; hence their Anglo-American name, "Painters' Pots." Towards the north-east extremity of the National Park a source of fire-damp has also been discovered on the banks of the Cache Creek affluent of the Yellowstone. The ground in the neighbourhood of the deadly exhalations is strewn with the remains of animals, including even bears and elks.

The Bad Lands.—The Black Hills.

East of the outer ramparts of the Rocky Mountains the foothills develop distinct ridges or isolated massive groups, such as Highwood Peak (4,620 feet), which commands the south bank of the Missouri below its last gorges. Farther south, the Little Belt Mountains are disposed parallel with the chain of the Great Belt Mountains. East of the Big Horn Range, a labyrinth of heights occupies a space of some thousand square miles, which bears the Franco-Canadian name of "Mauvaises Terres," or, as it is now more commonly called, the "Bad Lands." These rugged heights are the remains of an ancient plateau, which the running waters and atmospheric agencies have scored and ravined in all directions, leaving the surface strewn with irregular fragments of fantastic form, towers, steps, superimposed edifices, storeyed cathedrals and belfries. The upper level strata, where they have remained intact, all stand at the same elevation, while the exposed layers of diversely-coloured indurated clays and ferruginous sands along their escarpments correspond on either side of the ravines. From a distance the Bad Lands resemble a ruined city, or else those weird pictures raised by the mirage above the horizon. The Indians naturally avoided penetrating into this maze of gorges, where fear or fancy conjured up a whole world of shapeless or baneful beings. There can be no doubt that the plateau of the Bad Lands was formerly the bed of a vast lake which stretched along the foot of the Rocky Mountains. The action of water is revealed in the nature of its geological constitution, its sedimentary strata, and the remains of fossil animals here found in prodigious quantities. Owing to their friable texture, these strata were easily enough eroded, and in some places fire is supposed to have been an agent in producing the ravines. The underlying layers of lignite having taken fire, the upper beds would have fallen in, the collapse resulting in a chaos of ruins. The fumeroles, which have been observed here and there along the river banks,

in fact indicate the presence of lignite still in combustion, and in such places rifts and fissures must in time be produced in the upper crust.

The mountain range known by the name of the Black Hills, which extends north and south between the forks of the Cheyenne, a western affluent of the Missouri, forms the most advanced buttress to the outer escarpments of the Rocky Mountains. This range, called "black" from its pine-clad slopes, is free from snow in summer; even Harney's Peak, its culminating point, does not exceed 9,650 feet above sea-level. But in their geological structure, the Black Hills are specially interesting, forming, as they do, a sort of epitome of the whole Rocky Mountains system. In both alike, the core consists of granite and other crystalline rocks, everywhere underlying sedimentary formations of Silurian and Devonian epochs. Then follow carboniferous rocks, and farther on a zone of red secondary strata, triassic or jurassic, developed along the periphery of the range, which is plunged bodily into layers of tertiary origin, first deposited in shallow, inland seas, and then scored and carved by running waters into diverse forms. The Devil's Tower, one of these fantastic isolated blocks, rises sheer above a group of trachytic columns to the inaccessible height of over 650 feet.

South and south-east of the Black Hills stretch other "Bad Lands," similar in character to those of the north-west. Still farther south, between the Niobrara and the bed of the north Platte, extend vast sandy wastes left by the waters of the dried-up inland sea, and now lashed by the winds into parallel ranges of billowy sandhills. This inland sea still existed in the miocene epoch, at which time it flooded the whole space comprised between the Black Hills and the face of the Rocky Mountains for a distance of over 200 miles to the south. In the pliocene epoch, the lake, which had meanwhile disappeared, together with a highly characteristic fauna, was re-formed with undiminished limits, as shown by fresh deposits of fossil animal remains. Certain districts of the Bad Lands are so crowded with these remains that they have been compared to a vast cemetery. The explorers, Hayden and Cope, have here discovered no less than seventy species new to science, ranging from the size of a mole to that of an elephant, and including reptiles, rodents, carnivora, animals intermediate between the deer and the mammoth, between the mastodon and the rhinoceros. It was in the same Bad Lands, south-east of the Black Hills, that the geologist Marsh and his companions, creeping stealthily between the bands of Sioux and other hostile Indians, made that wonderful expedition of 1874, from which they brought back those astonishing fossil remains which are now to be seen in the Museum of Yale University, New Haven.

From the old lakes to the plateau between the eastern and western border ranges of the Rocky Mountains, the incline is extremely regular. Following the course of the North Fork of the Platte River, the traveller ascends imperceptibly to the foot of the mountains, penetrating beyond them into a broad depression, which leads by a long detour to the uplands. From the Platte valley that of its affluent, the Sweetwater, is reached, beyond which the track, leaving to the right and left some parallel mountain ranges, penetrates through the South

Pass (7,500 feet), a gently undulating gap about 20 miles broad, which leads to the waterparting between the Mississippi and Colorado slopes. Here the actual dividing-line rises scarcely more than 60 or 70 feet above the normal level. Although few gaps are more clearly marked between the different sections of the same range, none of the transcontinental railways have followed the South Pass, which has the disadvantage of lying too far north of the direct line from Chicago and Saint Louis westwards to San Francisco. On the other hand, Evans' Pass (8,269 feet), which was adopted for the first railway constructed through the United States from ocean to ocean, is also of easy access. Evans' Pass, however, is only the first obstacle overcome; beyond it the line has still to ascend to Sherman Station (8,350 feet), then turn some mountain groups and traverse the upper Sweetwater valley before reaching the parting of the waters between the Mississippi and Colorado basins. And farther west, many other passes had to be surmounted before reaching the descent to the Pacific on the outer slope of the Sierra Nevada.

The Black Mountains and Front Range.—Pike's Peak.

South of the North Fork of the Platte, the eastern border-chain of the Rockies is continued under the name of the Black Mountains, a designation due, like that of the Black Hills, to the sombre pine forests, which present such a forcible contrast to the neutral grey tint of the treeless plains. The chain runs first west and east, and then trends north and south, thus developing a vast semicircle and enclosing on two sides the argillaceous Laramie Plains, which, like the Bad Lands, also at one time formed a lacustrine basin. Laramie Peak, about 10,000 feet high, forms the keystone of the range towards the middle of its convexity, where it bends sharply round to the south. Along this meridional section of the system the higher crests maintain a tolerably uniform elevation. Despite the gap where it is pierced through and through by the Laramie River, and the breach at Evans' Pass, followed by the transcontinental railway, this range is not a distinct fragment, but evidently forms the northern division of the heights, which, after joining the lateral ridge of the Medicine Bow Mountains at an acute angle, are continued still southwards under the name of the Colorado range. Its imposing appearance has earned for this section the alternate title of the Front Range. It presents the aspect of a superb rampart of snowy crests extending uninterruptedly a distance of nearly 250 miles, and forming a perfectly regular border range to the chaos of mountains, valleys, plateaux, and deserts which occupy the western part of the continent for a space of 600 or 700 miles farther west. At their base there stretches a parallel chain of low sandy or shingly hills, sandstones and conglomerates in former times washed down from the main range by the running waters, and afterwards detached from it by other torrents. Seen from these crests, the mountains stand out in bold contrast from the plains, while the endless variety of their craggy heights, pillars, eroded flats, terraces of monumental aspect, storeyed towers, tiers of semicircular steps, render these advanced ramparts of

the Rocky Mountains one of the most romantic regions in the United States. Two of the chief peaks in the Front Range, Clarke (13,156 feet) and Long (14,271 feet), have been so named from the American explorers, who were amongst the first to traverse the Rocky Mountains. Long Peak presents on one side an inaccessible wall composed of vertical slabs, which break away by cleavage from top to bottom, leaving the rocky surface smooth, straight and forbidding.

Fig. 160.—Laramie Plain.

Scale 1 : 850,000.

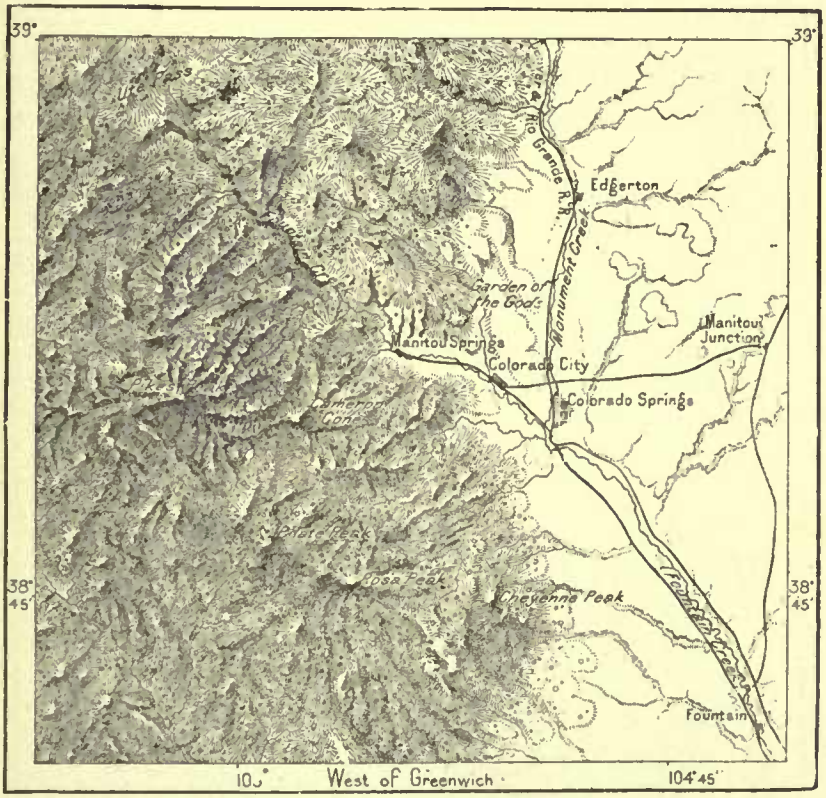
From a distance it seems to terminate in two little peaks, the *Deux Oreilles* ("Two Ears") of the old Canadian voyageurs.

Farther south Mount Lincoln attains a height of 14,296 feet; but at this point the system is already masked on the east side by a chain of foothills and by a spur of the main range, which terminates northwards in Pike's Peak (14,147 feet), the famous landmark to the pioneers of "'59." This summit is named from Major Pike, who in 1804 made a daring effort to reach the top. The summit was first ascended by the naturalist James about the year 1820, and it has since been more frequently scaled perhaps than any of the other lofty heights in

the Far West. Rising majestically above the plains of the Platte and Arkansas Rivers, this "Monte Viso" of North America till recently gave its name to the whole region, and emigrants bound for the Rockies were popularly spoken of as "Pike's Peakers." Even at this day settlers arriving in California from the foot of the Rocky Mountains are known by this name. The observatory founded by the astronomer Pickering on the natural platform with which the peak terminates at an altitude of over 14,000 feet, is the highest in the world, exceeding that of Leh, in Ladak, on the frontier of British India towards West Tibet, by 2,900 feet.*

Fig. 161.—Pike's Peak.

Scale 1 : 380,000.



The Parks—The Sangre de Cristo, Elk, and Sawatch Ranges.

West of the outer rampart formed by the Front Range, the spacious upland valleys encircled on all sides by lofty mountains have received the name of "parks"; in reality they are rather elevated coombs or depressions, whence radiate numerous lateral river valleys at a mean altitude of from 7,500 to 10,000 feet, and dominated by crests some 3,000 or 4,000 feet higher. The three principal basins—North Park, Middle Park, and South Park—follow in suc-

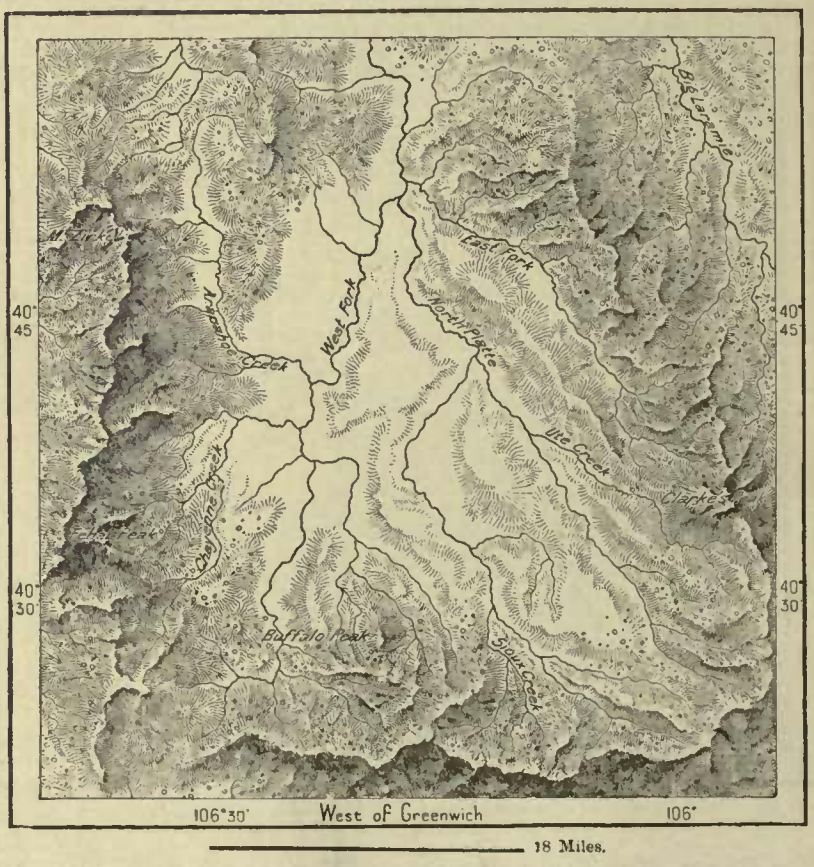
* Atmospheric pressure on Pike's Peak, 0·451, or 0·6 of the barometric column at sea-level. Mean summer temperature (July), 40° Fahr. Mean winter temperature (January), 2° Fahr. Extremes, 63° or 64° Fahr. and —39° Fahr.

cession from north to south, with somewhat uniform areas, from 700 or 800 to over 1,000 square miles.

North Park, which is limited east and west by two parallel chains, is the most regular of these elevated amphitheatres. Its torrents, issuing from valleys which ramify like the ribs of a fan, have forced themselves a common outlet at the northern extremity of the old lacustrine basin. The united streams form the North Fork of the Platte, which trends round to the east after its junction with the Sweetwater from the west. This depression is fertile and well grassed,

Fig. 162.—North Park.

Scale 1 : 750,000.



affording good pasturage to numerous herds of cattle, and in the spring and fall to countless bands of antelope (Hayden). Middle Park, which is separated from the northern basin by a simple ridge of volcanic rocks, belongs not to the Mississippi, but to the Pacific slope, having a westward dip and sending the overflow of its rain and snow waters to the Grand River, a Colorado affluent. Unlike North Park, this basin forms a group of narrow valleys, separated one from the other by high spurs ramifying from the outer walls of the depression. Lastly, South Park, comprised between the crests culminating in Lincoln and Pike's Peak, drains, as if to redress the balance, north-east through the South Fork of the

Platte to the Mississippi. It forms an elliptical tableland of somewhat uniform surface, broken by a few lesser ridges, and towards the south by numerous buttes of volcanic origin. The surface, about 1,000 square miles in extent, is mostly covered with rich bunch-grass, which yields excellent fodder for cattle.

Another great valley, that of San Luis, which was formerly a lacustrine depression, is also at times improperly spoken of as a "park." In reality it is a vast plain of sands or clays levelled by the waters, stretching for a distance of

Fig. 163.—South Park.

Scale 1 : 800,000.

140 miles southwards, with a mean breadth of 35 or 40 miles, and traversed during the rainy season by an affluent of the Rio Grande. Smaller basins, which would elsewhere be called cirques, coombs, or glens, all take the name of "parks" in this region of the Rocky Mountains, while the lesser depressions are jocularly called "holes." The general term, "Park Range," is applied to the irregular heights which constitute, west of the parks, a sort of chain, or rather the escarpment of the western plateau. Here are, nevertheless, some lofty summits, such as Quandary Peak (14,269 feet), and several others of nearly equal altitude. Farther

on the system dwindles to a few hills of moderate elevation. Westwards extend a series of terraced plateaux, falling successively down to the level of the Grand and Green River basins, whose junction forms the Colorado.

Exposed to the parching atmosphere of the great plains west of the Mississippi, and receiving but little moisture from any quarter, on an average less than twenty inches a year, the Front Range wears its snowy mantle only for about six months during the cold season. In the heart of summer little is seen except some slight whitish streaks, formed by the frozen snows heaped up in the fissures of the rocks. Nevertheless, a few small glaciers occur here and there in places less exposed to the solar rays. The largest of these crystal streams extends along the gentle slope of Mummy Mountain, north of Long's Peak, where it is dominated by a crest of blackish rocks. On one occasion, during a flight of locusts, myriads of these winged pests fell on the snows between Utah and Colorado, and the bears, leaving the lower valleys, swarmed up to the higher grounds to enjoy the windfall. It was then that a sportsman in pursuit of large game discovered the vast "snowfield," which was afterwards ascertained to be a true glacier, with all the accessory crevasses, seracs, and moraines. It has received the name of Haller's Glacier, from one of its explorers.

But if glaciers are now rare and of small size, traces are still visible of vast icecaps, which formerly covered the whole surface of the parks above 10,000 feet, and which scored and polished the mountain slopes at a somewhat uniform elevation. Erratic boulders, formerly brought down by the crystalline masses, are strewn over the hillsides, above the yawning chasms excavated by the torrents in the accumulated debris of the moraines.

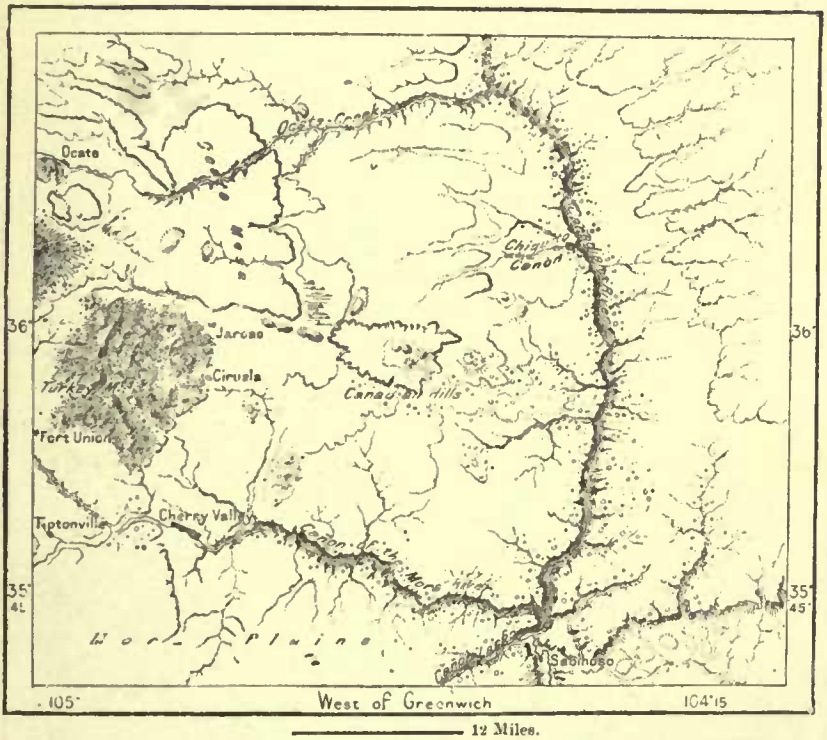
One of the most frequented spots in this region, thanks to the vicinity of the Colorado Springs watering-place, has been named the "Garden of the Gods," so powerfully has the imagination of the visitors been struck by its sandstone obelisks, eroded by the running waters, and weathered by the winds, sands, frosts and thaws, and then left standing in the midst of the grassy slopes and woodlands. On one side stretches the plain, merging in the distance with the bluish horizon, on the other rises this charming amphitheatre of verdant heights.

South of the narrow gorge, through which the Arkansas River escapes, the Front Range is continued under the Spanish and, to English ears, somewhat profane name of "Sangre de Cristo." Here the student enters another historic zone, where discovery and settlement have been made, not by Franco-Canadian or Anglo-American pioneers, as in the northern section of the Rocky Mountains, but by Mexicans of Spanish speech. The culminating point of the Sangre de Cristo, often snow-clad, despite its southerly situation between 35° and 38° north latitude, takes the name of the Sierra Blanca, and has an altitude of 14,464 feet. It thus overtops by some feet the rival peaks of the Rockies properly so called. The point, however, is not yet quite settled, for there are over fifty summits, all having much the same elevation. Farther south, along the section of the chain called the Spanish Range, follow other peaks, such as La Culebra (14,100 feet), and Baldy Peak (12,500 feet). These are continued southwards by isolated crests,

including the Ocate Volcano (8,900 feet), and Turkey Mountain (9,360 feet), flanked on the east side by two superimposed lava plateaux, which have been carved by erosion into huge mesas or "tables." Here the deposits of anthracite embedded in the underlying strata have been transformed to a coke of excellent quality by the heat of the molten lavas. East of the main range, which skirts the San Luis valley throughout its entire length, rise the two isolated trachytic cones, the Spanish Peaks, towering high above the surrounding heights.

Here ceases the range properly so called, although spurs still branch off into the neighbouring plains. Huge isolated groups also rise farther south, as if in continuation of the Rocky Mountains, which, however, really terminate in this

Fig. 164.—Ocate and its Lava-fields.
Scale 1 : 870,000.



district. The ranges which are visible away to the south, and which penetrate from New Mexico and Texas into Mexico, belong to another system. Their geological structure also differs. The masses of granite prevailing in the Front Range and neighbouring crests disappear south of the Sangre de Cristo under the strata of secondary origin, which are continued to a great distance by the jurassic plateau of the Staked Plain. The Pyramid Mountain, an eminence ravined with perfect regularity on all sides, resembles a geological model, showing the succession of horizontal strata, all differing in colour and texture. Numerous igneous cones are grouped above the dreary wastes, which were formerly flooded by marine waters; the reddish lava streams ejected from these now-extinct cones still glow in the fierce sunshine, as if they had scarcely yet cooled down.

West of the outer chains bordering the plateau, other mountain ranges, rising above the common pedestal, are disposed in various directions. The Sawatch or Saguache Mountains, one of these ridges, is connected by spurs with the Park Range, while itself forming a northern continuation of the Sierra San Juan, which skirts the west side of the San Juan Valley. Mounts Harvard (14,375) and Yale (14,187), so named in honour of the great New England Universities, rise above the crest of the sierra in a line with several others, such as Holy Cross (14,176 feet), which takes its name from the figure of a cross formed on its

Fig. 165.—Uncompahgre Plateau and Sindbad Valley.

Scale 1 : 450,000.

eastern face by the snow filling two fissures disposed at right angles to each other, and glittering in the morning sunshine. The long shaft of the cross scores the almost vertical flank of the mountain for a length of about 1,000 feet from end to end. Farther south-west, the Uncompahgre group of lavas rises in majestic isolation to a height of 14,250 feet. Of igneous origin are also the detached masses collectively known as the Elk Mountains, which have a general trend from east to west, and which culminate in Castle Peak, an extinct cone over 14,000 feet high. But the disposition of these ridges, half lost in the mass of the plateau, is not


CANADA
ASSINIBOINE
WASHINGTON
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
OREGON
IDAHO
WYOMING
NEBRASKA
NEVADA
UTAH
COLORADO
KANSAS
GREAT BASIN
VANCOUVER I.
VICTORIA
VANCOUVER
OLYMPIA
Seattle
Tacoma
Portland
Salem
Spokane Falls
Walla Wallas
Helena
Butte City
BOISE CITY
Idaho City
SALT LAKE
CHEYENNE
DENVER
Leadville
SACRAMENTO
CARSON
Virginia
Stockton
Oakland
SAN FRANCISCO
S. Jose
Great Salt Lake
Snake Plains
Blue Mountains
Coast Range
Black Hills
Bad Lands
Yellowstone
Plateau du Missouri
Coteau du Missouri
Bismarck
Regina
Medecine Hat
Crows
Flatheads
Blackfeet
Sioux
Shoshones
Nez Perces
Cœur d'Alene
Columbia Plains
Klamath
Siskiyou M^tns
Eureka
Newport
Astoria
Dalles
125°
120°
115°
110°
105°
100°
45
40

easily determined. The most sharply defined features of the relief are not the higher crests of the mountains, but the abrupt scarps of the plateaux, in which the affluents of the Grand River and other watercourses have excavated their channels. What more remarkable instance of erosion than, for instance, the strange chasms of the so-called Sindbad Valley, excavated like the flooded arena of a Roman amphitheatre in the very crust of the rock? The saline water of this curious upland basin escapes through the Rio Salado, emissary to the Rio Dolores, a headstream of the Grand River fork of the Colorado. Amongst the crests that here stand out sharply from the confused mass of the plateau, distinguished either by their form or their elevation, Emmons mentions the Buffalo Peaks, which culminate in a summit 13,541 feet high, that is, from 1,000 to 1,500 feet higher than the surrounding crests. They form two regular pyramids, separated by a breach presenting the appearance of a ruined colonnade.

The Continental Divide—The Uinta and Wasatch Ranges.

The *Continental Divide*, that is, the waterparting between the two basins of the Atlantic (Gulf of Mexico) and Pacific Oceans, follows an extremely sinuous line, which coincides in no way with the crest of any regular mountain range, but, on the contrary, meanders lawlessly from one to another. The summits have but a slight elevation above their pedestal, while the passes at which it is crossed scarcely fall below the mean altitude of the plateau. The Cochetopa Pass, one of the least elevated, which crosses the Sawatch Range, and which the Indian hunters were formerly acquainted with as the chief track followed by the mountain bisons in their great annual migrations, has an altitude of about 10,000 feet. The railway, leading from Denver to Salt Lake City, is the most elevated in the United States, and crosses at Fremont Pass, that is, at an altitude of 12,820 feet, not more than 1,300 feet below the loftiest summit in the whole region. Farther south, another line, with numerous ramifications, utilises Marshall Pass, 10,950 feet high. The towns and villages, which have sprung up in this region in connection with the mining industries, all stand over 10,000 feet above sea-level. Leadville, the largest of these places, has an altitude of 10,200 feet, that is, 3,610 higher than Saint-Véran, the highest village in France. Yet some smaller groups of habitations stand 1,000 feet above Leadville.

South of the upland plains traversed by the first transcontinental railway constructed from New York to San Francisco, a mountain range runs east and west a distance of about 150 miles with a mean breadth of from 30 to 40 miles. This range, which lies athwart the longitudinal axis of the orographic system, has preserved its Indian name of the Uinta Mountains. It connects the Rockies, properly so called, with the Wasatch Range, eastern limit of the "Great Basin" of Utah. The Uintas may be regarded as a typical specimen of mountains with folded strata. The layers belonging to various formations, ranging from the archæan and Cambrian epochs to the horizons of the chalk and tertiary periods, are disposed in perfectly regular anticlinal lines. The range attains a total thick-

ness of at least 26,000 feet, judging at least from the actual profile of the curvature. But the ruined peaks which still rise above the axis of the chain, Mounts Agassiz and Emmons and Gilbert's Peak (13,700 feet), do not exceed the average elevation of the eminences on the plateau. The folding of the strata must have been a gradual process without any abrupt convulsions, for the rivers descending from the slopes have never shifted their beds. During the course of ages they have excavated these beds to a tremendous depth, thus forming profound cañons like those of the Green River, one of the main branches of the Colorado.

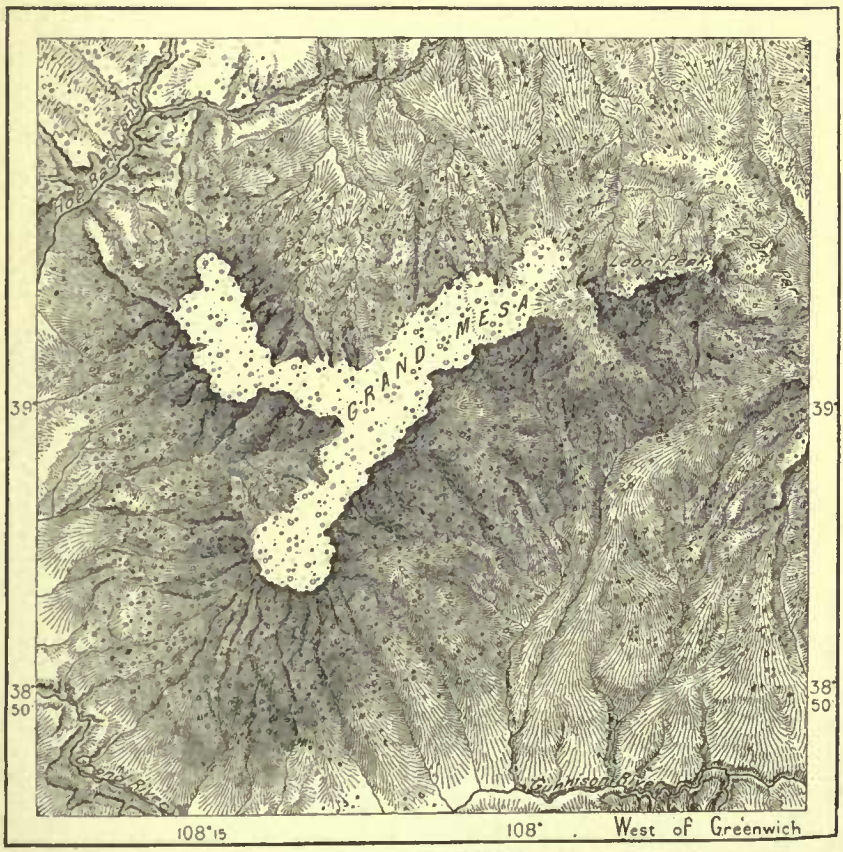
The Wasatch Mountains, like the Front Range, are scarcely more than the scarp of the great plateau. Nevertheless, on the west side, above the old lacustrine plains of Utah, they present the aspect of an imposing rampart, rising from 5,000 to 6,000 or 7,000 feet above their elevated pedestal. They form the southern extension of the groups belonging to the Yellowstone National Park, where occurs the parting of the waters flowing to the Missouri, the Columbia, and the Colorado basins. But the Wasatch system, which in the Wyoming Peak attains an altitude of about 11,500 feet, does not form a distinct range. It is carved into a labyrinth of unequal fragments by the winding fluvial valleys on either slope. The chain presents no clear outlines except on the south side of the Bear River, which, after piercing the whole mountainous region, discharges its waters in the Great Salt Lake. Farther south, the range is again pierced by the Weber, another watercourse, whose narrow gorge is followed by the Central Pacific Railway in order to penetrate from the Laramie and Bridger plains westwards to the "Great Basin" of Utah. Another line utilises the valley of the Bear River, gaining access through its lower gorges to the Snake River valley.

South of the Weber gorge begins the range, properly so called, of the Wasatch Mountains, which extends north and south a distance of about 250 miles. It increases in altitude in the direction of the south, where it develops the Mount Nebo, from whose summit the Mormons first beheld the "promised land." Farther on the Wasatch Range begins to merge in the thickness of the rugged masses constituting the deserts of Colorado with their lines of lofty cliffs disposed in various directions. Here stand Mounts Terrill (11,600 feet) and Belknap (12,200 feet), besides several other less elevated summits. The expression, "Paradise of Geologists," has been given to these plateaux, mountains, and treeless cliffs, where igneous cones have discharged their rugged lava streams, where the granites and archæan rocks still crop out here and there under the overlying secondary formations and the tertiary strata. Thanks to the cuttings and erosions, the observer is enabled easily to study the series of superimposed strata and to determine without difficulty their respective thickness, their inclination, and a thousand other details. Here may be read the geological record of the world, which is elsewhere so difficult to decipher, especially in West Europe, where the stratified rocks have been dislocated, at times even completely reversed and covered with vegetable humus, forests, and plantations. In the short space of fifteen years, the American naturalists have been able to interpret the phenomena of

erosion more clearly and more conclusively than their European colleagues had succeeded in doing since the beginning of geology.

The extent of denudation produced in the course of time on these elevated tablelands may now be estimated with some approach to accuracy, so distinctly are seen the successive horizontal layers of the Permian, triassic, jurassic, and eocene systems, often in vivid colours, and carved by the wear and tear of ages into storeyed monuments of past geological events. By a comparative study of the various plateaux, the observer is able to supply the missing links in each of the

Fig. 166.—Grand Mesa.
Scale 1 : 500,000.



stratified systems. A thickness of about 5,000 feet has been removed over a space exceeding 200,000 square miles in superficial area. Such a mass would represent a cube of over 56 miles in all directions. Nowhere is it possible to realise the extent to which erosion has been carried more clearly than in this fragment of a perfectly level "table," with its ravined escarpments, which, under the name of Grand Mesa, stretches between the Grand and Gunnison affluents of the upper Colorado. The whole group of plateaux is decomposed into a number of distinct sections, of which the most elevated is the Kaibab, standing at a mean altitude of 7,300 feet.

Volcanic Agencies—The Great Basin.

South of the cañons, or gorges, through which the Colorado and its various affluents have carved their way seawards, the mass of highlands is decomposed in separate groups and secondary ridges, which have a normal trend from north-west to south-east, and which merge ultimately in the Sierra Madre of Mexico. A large number of igneous vents occurs in this southern region of the Rocky Mountains, where the eruptive matter has been heaped up in huge cones, whence

Fig. 167.—San Francisco Peak.

Scale 1 : 500,000.

the molten lavas diverge in various directions to great distances. The San Francisco peak, one of these cones or rather groups of formerly active volcanoes, rises to a height of 12,800 feet, and is pierced by a crater, the mouth of which is still visible on its east flank. This igneous crest rises in solitary grandeur, girdled round its lower slopes with gloomy forests of pines and cedars, which contrast sharply with the grey or reddish tints of the surrounding rocks. Even in summer the higher escarpments of the cone facing northwards are still draped in

a snowy mantle. The uplands inhabited by the Zuñi Indians, east of the middle course of the Rio Grande, have also their volcanoes, amongst others Mount Taylor, or San Mateo (11,380 feet), whose lava streams have overflowed into all the surrounding valleys. On the opposite slope of the valley extensive hilly districts are also overlaid with eruptive matter. This region of New Mexico has also its *malpais*, or "bad lands," like the igneous districts of the Anahuac plateau. North of Paso del Norte a mountain glen is filled with a thick lava bed, which has pro-

Fig. 168.—Bluff on the Green River at upper end of the Grand Cañon.

bably welled up from some hidden fissure in the rocks; at least, no crater is now visible from which it might have been discharged.

Between the eastern ranges which constitute the Rocky Mountains, properly so called, and those of the west which form the western escarpment of the uplands facing the Pacific Ocean, there stretches a vast intermediate space traversed here and there by distinct mountain chains, but in general presenting rather the aspect of a plateau that has been gradually built up of sands, clays, and deposits of calcareous origin. The northern sections between the border ranges are nearly half

filled with lavas from the western volcanoes in California and Oregon, and afterwards spread over a closed basin within the circle of northern and eastern heights.

Here the lava-field ramifying to the lateral valleys right and left covers a space estimated at over 200,000 square miles. The entire plain comprised between the course of the Spokane, the Columbia and Snake Rivers is covered with an unbroken mass of lava 24,000 square miles in extent. In many places the thickness of these prodigious eruptive masses is revealed to the eye by the channels cut by torrents and streams deep into the rock. From the bed of these streams the

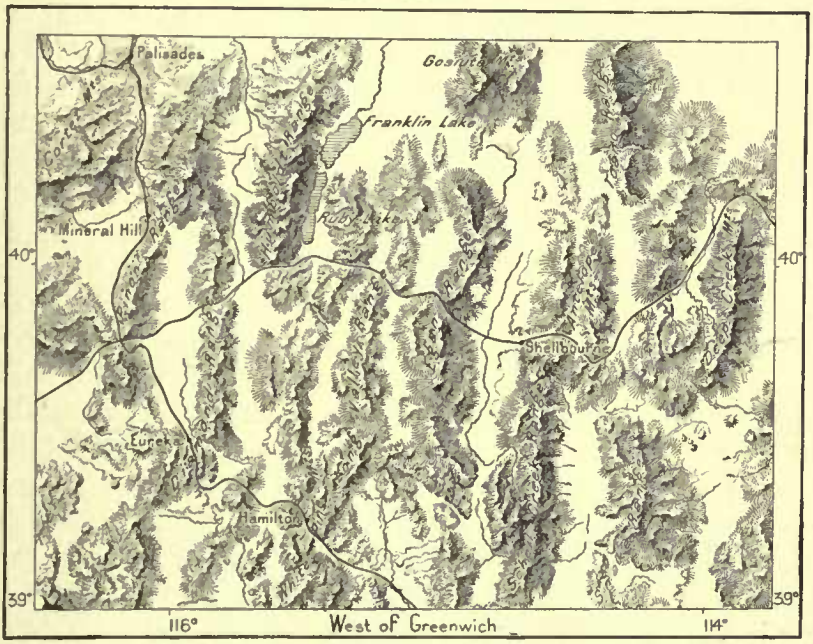
Fig. 169.—Great Lava-stream of the Malpais.

Scale 1 : 800,000.

observer perceives that the sides of the gorges and, higher up, the escarpments as far as the edge of the plateau, consist entirely of lavas irregularly eroded by meteoric agencies. These vertical cliffs discharged in the fluid state from the bowels of the earth have an average height of from 1,500 to 2,400 feet. In the great cañon of the Columbia the river flows for a distance of about two miles on the primitive granite rock, which enables the geologist to measure the exact thickness of the overlying lava bed. At this point it has accumulated to a height of about 3,700 feet, and has been formed by a great number of successive discharges. In the Deschuttes River basin the geologist Leconte recorded the presence of thirty

such superimposed layers. Rifts and vents in the form of crater mouths seem to be the orifices whence issued these enormous quantities of molten matter, which has been diffused horizontally over such a large section of the continent. The upper layers of lava are generally found to be more porous or less compact than the deeper strata, which have acquired a closer texture through pressure from the superincumbent masses. Whenever the streams have cut their way right down, the columns seen in the thickness of the rock are always larger and more sharply chiselled at the base of the vertical cliffs. These recurrent inundations of liquid rock probably took place during the tertiary epoch, or even at some more recent period, for the stems of trees that have been found embedded in the erupted lavas belong to species of conifers analogous to those at present prevailing in the sur-

Fig. 170.—Parallel Ranges of the Utah Plateau.
Scale 1 : 2,400,000.



rounding forests. But even since that comparatively recent epoch the general aspect of the land has undergone a great change. The lakes formed by the lavas dammed up at the issues of the valleys have again been discharged; the streams have carved themselves fresh channels; then the glaciers spreading their crystalline masses over the plains have strewn them with boulders and drift, which have in their turn modified the local hydrographic systems, by compelling the running waters to shift their courses.

The vast lava-fields of the Columbia basin are limited southwards by a rampart of mountains, the chief range in which bears the name of the Blue Mountains. South of them stretch the plains of the "Great Basin" at a mean altitude of 5,000 feet. This basin has its greatest elevation in the centre, thus forming a sort of surbased or flattened vault falling eastwards in the direction of the Wasatch

Mountains, westwards towards the Sierra Nevada. On the south side the incline is very rapid down to the verge of the sandy Mohave Desert in southern California, where the plateau develops the long depression of Death Valley parallel with the axis of the Sierra Nevada. Although its rugosities have been largely obliterated by the deposits of successive ages in secondary and tertiary times, the Great Basin is by no means destitute of mountains. Numerous ridges are disposed with remarkable regularity in parallel lines from north to south at various elevations above the intervening depressions. A traveller wishing to make his way in a straight line from Lake Tahoe, in the Sierra Nevada, to the base of the Wasatch Mountains would have to cross some twenty of these steep bare rocky crests. The east Humboldt Range, loftiest and one of the longest of these ridges, forms a western border to the arid plains skirting the shores of the Great Salt Lake. It terminates northwards in the Bonpland Peak (11,300 feet), which is the highest point in the region of the Great Basin. As a rule all these chains and buttes stretching across the plateau rise abruptly from the ground, flanked by no buttress or gently inclined slope merging gradually in the declivities of the surrounding lands. They are, in fact, mere crests, whose base has been overlaid by later alluvial deposits. So obvious even to the ordinary observer is this geological phenomenon that pioneers and immigrants have given the name of "Lost Mountains" to the ridges thus rising abruptly above the more recent argillaceous clays. Their Utah Indian name, Oquirrh, has the same meaning.

Amongst these heights of the Great Basin hundreds affect the form of domes, either isolated or grouped in parallel lines. They are huge excrescences of carboniferous rocks, or of subsequent formations down to tertiary deposits, which have been upheaved by the protrusion of lava from below, which spread laterally between the strata, forming immense buried cakes of lava, to which Gilbert has given the name of "laccolites." Such buttes or knolls may in fact be regarded as unfinished volcanoes. The Henry Mountains in south Utah are a typical example of these domes thrust up by a central force, and many other eminences have been discovered, all formed in the same way. Such are the Sierras de la Sal, de Abajo, de Carriso, de Navajo farther south, and in the east the Elk Mountains of Colorado. North of the valley of the Rio Virgen affluent of the Colorado, the plateau terminates in the three superb pyramids which bear the name of the "Three Tetons" in common with some other groups in the Rocky Mountains system.

The Western Border Ranges—The Cascades—Mount Shasta.

Of all the North American mountains the border ranges skirting the west side of the plateau are the most regular, if not in the character of the rocks, at least in their general trend and relief. In this respect they are superior even to the Appalachian system taken in its entirety from Maine to Alabama. Nevertheless these western highlands have no common collective name, the northern section being known as the Cascade Range, as in British Columbia, while the section south of Mount Shasta retains its Spanish designation of the Sierra Nevada, or "Snowy Range."

The Cascades, so named from the falls of the Columbia and other rivers traversing them, or rising on their slopes, form the simplest part of the system. The volcanoes rising to about double the height of the crest, which has a mean elevation of from 5,000 to 6 000 feet, do not all spring from the main axis, and their lava streams have been spread in long promontories over the surrounding plains.

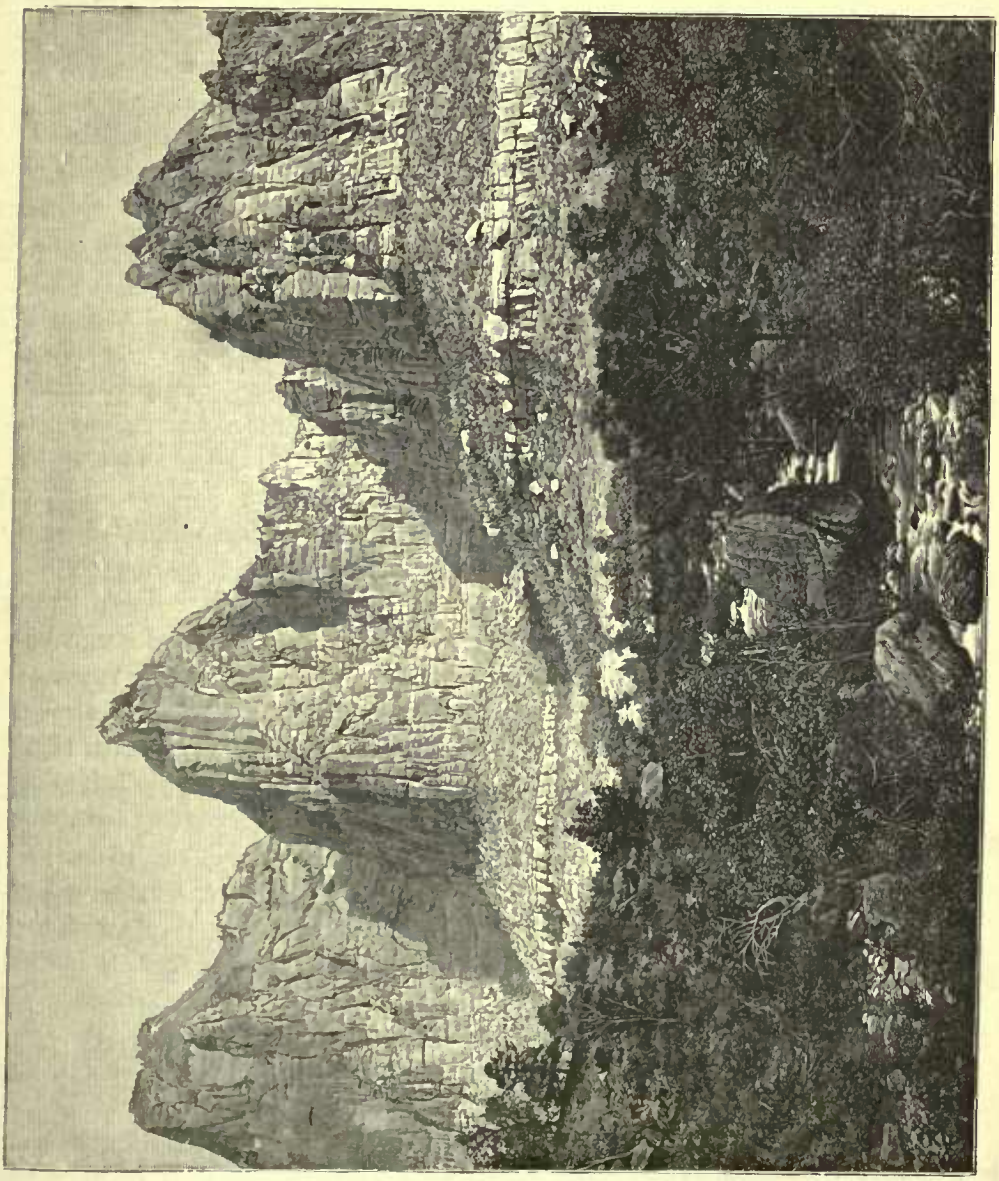
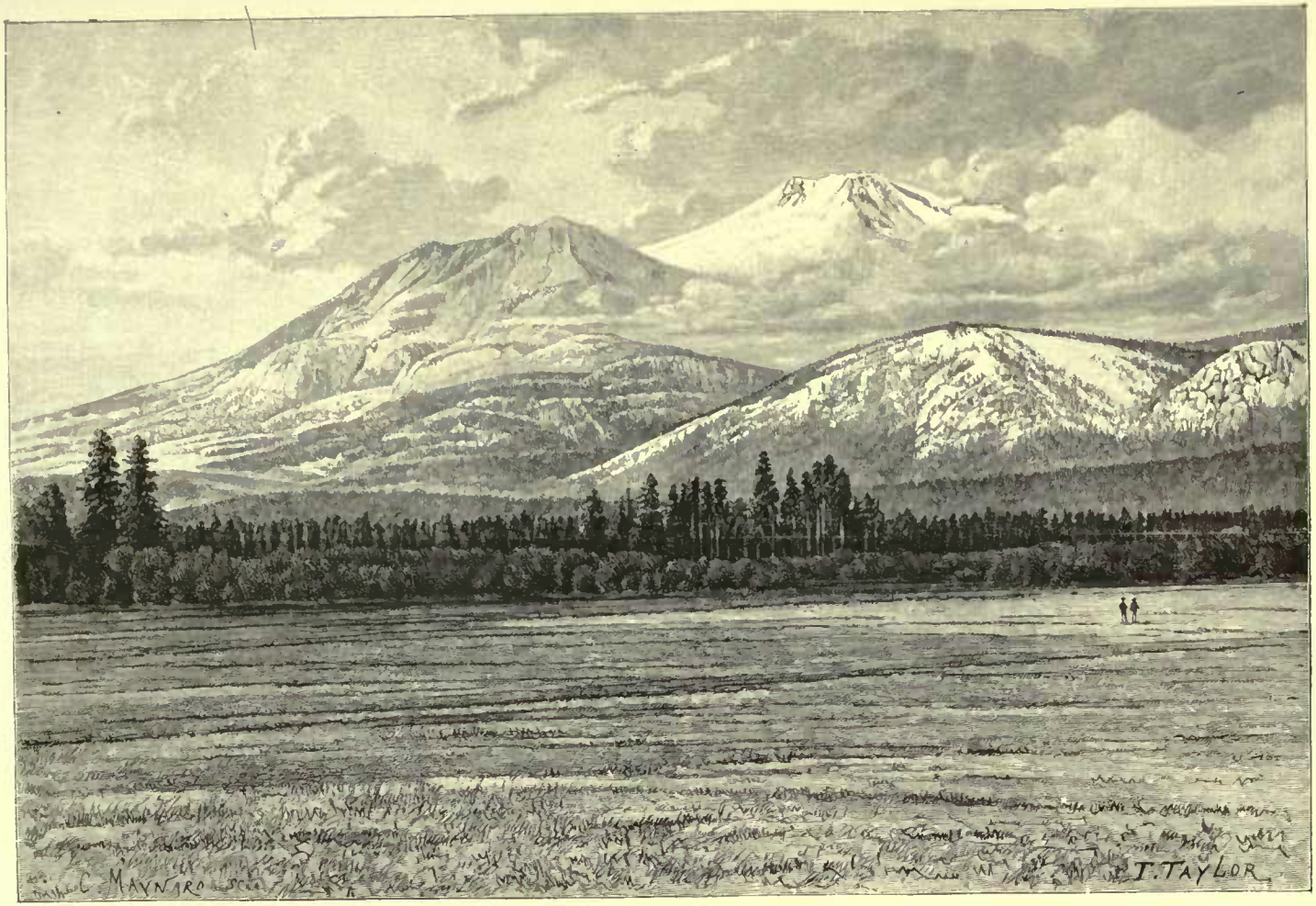


Fig. 171.—Rocky Mountains Scenery—The Three Tetons of Utah.

Mount Baker, which stands in immediate proximity to the Canadian frontier, and whose crest (10,760 feet) is often visible to the inhabitants of Vancouver Island, appears to be the most active of all the burning mountains in this region. In 1843 and again three times since that date, it ejected ashes in sufficient quantity to dam up the current of the Skagit River; but it is uncertain whether any

lavas were discharged on those occasions. Mount Rainier is the culminating point of the Cascades, towering to a height of 14,444 feet. Although it has not been the theatre of any disturbances in contemporary times, its vast crater, now partly filled with snow and enclosed within a still more ancient orifice, emits abundant vapours which afford some warmth to Alpine climbers in those higher atmospheric regions. The presence of glaciers, one of which is ten miles long by five miles broad, was determined some thirty years ago by Lieutenant A. von Kanz, who when trying to reach the summit found his way barred by these obstacles. Mount Saint Helens (9,750 feet), which stands athwart the course of the Columbia, deflecting it southwards and obliging it to describe a vast semicircle round its base, appears to have been in eruption in 1843, the same year as Mount Baker. Clouds of dust from volcanic eruptions are frequently wafted hundreds and even thousands of miles. Mount Adams, its eastern neighbour, and also nearly 10,000 feet high, seems to have been long extinct. But while still active it must have displayed prodigious energy. This lofty cone, now covered with snow to the very summit, and clothed in verdure on its lower slopes, is the source whence flowed the lavas which formerly dammed up the Columbia with a huge barrier 3,600 feet thick. Like its neighbours, Mount Adams has also its glaciers, and all the streams crossed by the coast railway have that milky colour which is so characteristic of ice-born torrents.

South of the Columbia the long line of igneous cones, all connected by a continuous zone of lavas and scoriæ, follows parallel with the coast along the escarpment of the plateau at a distance of about 380 miles from the sea. The imposing mass of Mount Hood (11,700 feet), commanding the river gorge, has often been described as a still-active volcano; but the columns of smoke supposed to issue from its crest are nothing more than wreaths of aqueous vapour condensed by the cooling of the atmosphere. Hood was first ascended in August, 1866, by the Rev. Mr. Atkinson and Alphonso Wood, who estimated its height at 17,430 feet. But this was reduced to 11,225 feet by Colonel Williamson, who scaled it in August, 1867, under more favourable atmospheric conditions. In the same year Professor Whitney, while engaged in a survey of Oregon, calculated its elevation at 11,700 feet, which seems to approach nearest to the truth. Similar discrepancies prevail respecting the height of many other crests in this region, as, for instance, Mount Baker, which has been variously estimated at 10,760, 10,650, and 10,500 feet. The other volcanoes which follow southwards appear to be all extinct or long quiescent. Such are Mount Jefferson or Hu-ah-hum (11,250 feet), which may be distinguished at a distance by the fragment of a breached crater supported by a sort of pillar known as the "Black Butte;" and the Three Sisters, with their snowy three-peaked summit (8,960 feet), encircled by other smaller "Sisters," which fail to reach the region of snow. The igneous basin of Crater Lake (6,250 feet) contains within the sharp rim of its lofty walls a lake no less than 2,000 feet deep. Like similar wonders in other parts of the United States this lake and the encircling rocks have been declared a "National Park," the common property of the nation. South of Mount Scott and



MOUNT SHASTA.

Mount Pitt, also extinct volcanoes, the chain of the Cascades is interrupted by a broad gap giving passage to the Klamath River, on its course to the Pacific. But the system at the same time broadens out with spurs and lateral ridges, including the transverse range of the Siskiyu Mountains, which extend right to the coast. The natural frontier between Oregon and California is here formed by a labyrinth of heights occupying a breadth of at least 90 or 100 miles.

Mount Shasta, the dominant volcano of the dividing-line, towers to a height of 14,440 feet above the sea, and about 11,000 above the surrounding plain of lavas, which serves as its pedestal, and which has a mean elevation of some 3,500 feet. Its flanks are girdled with a dark-green belt, formed by the

Fig. 172.—Mount Shasta.

Scale 1 : 375,000.

wooded slopes of the ravines scored round its base. But Shasta, the most majestic summit in the United States, derives its incomparable beauty from its absolute isolation, the exquisite grace of its contour-lines, the dazzling whiteness of its snow-capped crest, and the pale grey or rosy tints of its lava-fields enamelled in ice. This giant of the Cascades, as regular in outlines as it is lovely of aspect seen either in the morning mist or aglow with the purple rays of the setting sun, is by no means difficult to climb. Without the aid of ropes or other Alpine gear, any practised climber may reach the rim of the vast crater, which, within a circuit of three miles, contains a deep basin half filled with snow. From the sharp ledges of ice fringing the periphery the eye sweeps northwards over half of Oregon with its numerous volcanoes, and eastwards over the rugged plateaux of

the Great Basin with their grey expanses stretching away in the hazy distance. Towards the south is developed the long perspective of the Californian plains flanked on either side by the parallel Nevada and Coast Ranges.

Like Mounts Hood, Jefferson and the Three Sisters, Shasta has its frozen streams, some open, sparkling in the solar rays, some strewn with detritus and even with lava blocks. In several places the crevasses, piercing the glaciers to a great depth, are scarcely visible under the masses of débris covering the crystal surface and protecting it from the heat of the sun. Some of these glaciers are several miles long, but they are now little more than threads of ice compared to the copious frozen rivers which formerly overflowed through divergent gorges down to the surrounding plains. The course of these old crystal streams may still be traced by their lateral and frontal moraines, and the channels formerly scooped out by them are still followed by the avalanche and the mountain torrent.

Beneath the glacial record of the huge mountain is revealed the history of its eruptions. Ash Creek Butte, a fine parasitic cone, rises conspicuously to the north-east. Other eruptive centres occur in hundreds about the roots of the mountain, either scattered in disorder over the plain, or disposed along the lines of fissures. The very lava streams themselves bristle with countless little crater-like excrescences formed probably by the lakes, the streams or snows overtaken by the molten rocks and suddenly transformed to steam. In this way the sheets of ejected matter while still in fusion may have been pierced in various places by little local eruptions due to the vapours struggling to reach the surface.

Standing in a line with the main axis of the Sierra Nevada, Shasta has often been regarded as belonging to this range. On the other hand certain geographers have made it the southern limit of the Oregon mountain system. The fact is it forms part of the orographic system constituting the western escarpment of the Rocky Mountains, of which it must be considered a detached fragment.

Farther on, the main axis is indicated by a few volcanic eminences, and beyond them by the huge mass of Lassen's Peak, a truncated cone whose base has a periphery of about 100 miles. Unlike Shasta, this old volcano does not appear to be yet quite extinct. At least, it gives birth to numerous hot springs, and to two jets of vapour, which contribute to feed the little tarns flooding the cavities scattered over its eastern slopes. Its present elevation is 10,450 feet, but according to Richthofen and other geologists it was formerly far more lofty. To judge from what remains of its crater, the summit appears to have been blown away during some tremendous explosion; its crest, thus decapitated, lost some 6,000 or 7,000 feet of its original height.

The Sierra Nevada—The Yosemite Valley.

At Thompson's Peak, near the village of Susanville, the Sierra Nevada acquires its distinct individuality, stretching from this point as an unbroken rampart for some 450 miles along the east side of the deep Californian plains. Viewed as a whole, this range of mountains is the most regular, as well as the most

imposing, in the United States; in this respect it even surpasses the Front Range, inasmuch as it skirts the margin of a more fertile and far more diversified region. Disposed in the direction from north to south, with an incline of about 30 degrees to the east, the Sierra Nevada coincides almost exactly with the trend of the Pacific coast, from which it is distant some 160 miles. Its western slopes inclined towards California are far more gentle than the eastern escarpments, falling rapidly down to the plains of the Great Basin. The chain gradually increases in altitude from 6,000 or 7,000 to over 14,000 feet in the direction of the south, the mean height of the passes rising in the same proportion. These passes are narrow breaches serving to connect both slopes without reaching the level of the eastern plateau. Hence, except at two or three points, steep inclines have to be surmounted on both sides, in order to cross from slope to slope. Thus the Sierra Nevada is a true mountain range, and not merely the simple scarp of a plateau, presenting the aspect of a range from one side only. It is crossed by the Central Pacific Railway at Truckee Pass at a height of 6,935 feet above San Francisco Bay. One of the chief groups of the Sierra Nevada stands exactly under the same latitude as the bay. Here Mount Lyell towers to a height of 13,240 feet, flanked by several other less elevated peaks, but of extremely difficult access. These lofty crests, nearly always streaked with snow, present one of the grandest pictures in the Californian Alps, showing even a few small glaciers, the last which occur in the direction of the south. Yet, despite its romantic charms, this rugged region attracts few visitors, most travellers penetrating no farther than the gorge of the Merced River, at the foot of the mountains.

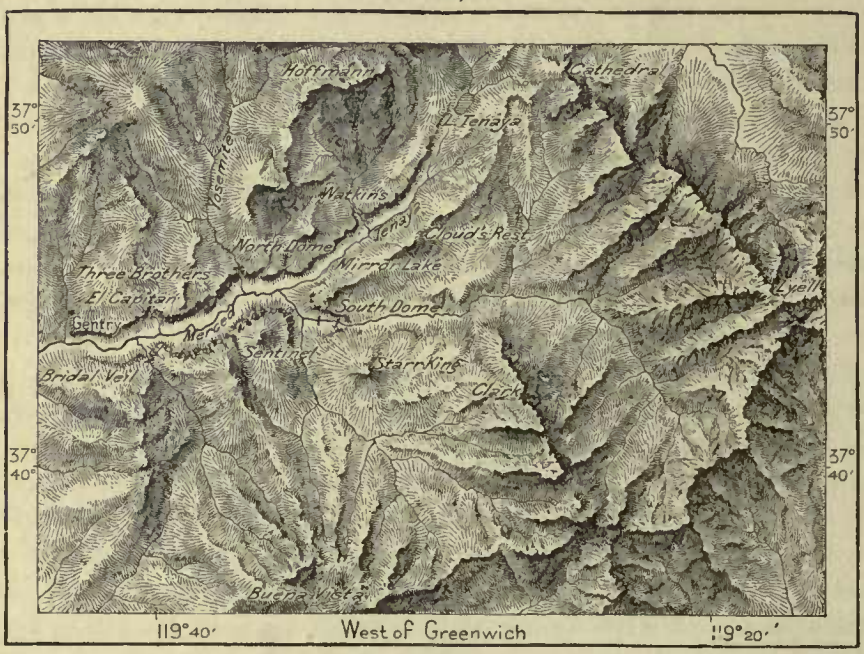
But this gorge is the far-famed Yosemite Valley ("Great Grizzly Bear," in one of the extinct local dialects), one of those remarkable sites which, like Niagara, the Bosphorus or Vesuvius, are held in universal admiration. The nearly level bed of the glen, with a mean breadth of from half a mile to little over a mile, winds along between nearly vertical rocky walls, which rise 4,000 and even 5,000 feet sheer above the stream, terminating in stupendous granite domes, while superb cliffs spring abruptly right up from the lateral ravines. Although clothed with verdure, these huge crags present scarcely any talus or accumulated débris at their base. The head of the glen is overgrown with spruce or cedar forests, their dark foliage presenting here and there charming "opes" or vistas, which vary with every turn of the winding stream. Stupendous waterfalls tumble over the granite ledges from a height of several hundred yards. One of these, the Yosemite Fall, is formed by the Yosemite affluent of the Merced, which descends 1,500 feet in a clear leap from the brink of the precipice, and then dashing against a projecting crag, escapes through a fissure in the rock, tumbling another 1,100 feet down to the right bank of the Merced, between the North Dome and the "Three Brothers." A little lower down, on the opposite side, follows the lovely Bridal Veil Fall, forming a column of water 630 feet high, which sways to and fro in the breeze, and almost dissolves into white spray before reaching the lower bed. A wise decision of Congress has withdrawn from the sale of public lands, and reserved to the nation for ever, this

marvellous Yosemite Valley, with the neighbouring uplands, to form another National Park, about 1,000,000 acres in extent.

South of the group dominated by Mount Lyell, the Sierra Nevada culminates towards its southern extremity in the majestic dome of Mount Whitney, loftiest summit in the United States, the giants of Alaska alone excepted. It rises to an altitude of 14,898 feet, which is nearly equal to that of Monte Rosa, and higher than Mont Cervin. But lying between 36° and 37° north latitude, some 600 miles nearer to the equator than its Swiss rivals, Whitney has a far less extensive display of snows and ice. It also lacks the charming contrasts produced by grassy or wooded slopes below the upper snowfields, and viewed as a whole,

Fig. 173.—Yosemite Valley.

Scale 1 : 400,000.



the huge mountain presents little to attract the eye beyond the grey or pink mass of its domes and granite peaks. But from both slopes the giant reveals himself in all his stern majesty. On one side stretch the low-lying Lake Tulare plains, scarcely 400 feet above sea-level; on the other, the deep depression of Death Valley opens beyond Owen's Lake, the dreary wastes and chains of hills towards the northern extremity of the Mohave Desert. One of the affluents of King's River, fed by the snows of Mounts Whitney and Tyndall, traverses the Tehipitee River valley, which presents features analogous to those of Yosemite. The torrent descends from a height of 1,770 feet into a narrow, wooded glen, flanked by nearly vertical walls, ranging from 2,500 to 4,000 feet in height. Near Mount Whitney, last lofty summit of the Sierra Nevada, the range trends

round to the south and south-west, where it joins the Coast Range some distance north of Los Angeles. At the Tahachapi Pass, where it is crossed by the Southern Pacific Railway, it falls to a height of 3,980 feet above sea-level.

The Goldfields.—The Coast Range.

Thanks to the Sierra Nevada, pre-eminently the auriferous chain of North America, California was rapidly peopled after its annexation to the United States. The gold-bearing reefs, all disposed in a line with the main axis, occur in the syenite formations, especially where they are associated with diorites and serpentines. But most of the miners seek these treasures in the huge masses of quartz or in débris formed from blocks of all shapes and sizes, which have accumulated in the quaternary gravels at the foot of the mountains. This auriferous drift has been carried down to a level of 1,500 or 1,600 feet above the sea by the glaciers, which formerly scored the flanks of the Sierra, and which had a thickness in some places of over 1,500 feet. At a later period all this detritus was again attacked by the running waters and redistributed in thick sandy or gravelly layers, which have been carved into distinct masses by still more recent erosive action. The particles of gold extracted from the primitive quartz were first deposited in the accumulated heaps of detritus, and again distributed here and there along the riverine tracts during the successive erosions of the streams. In the northern districts of California, where glacial action persisted for a much longer period, the auriferous drift has in many places a thickness of over 500 feet. But in the southern region, where glaciation ceased at an earlier epoch, and where the torrents have continued for a longer period their work of distribution, the old alluvia are much thinner. Hence the auriferous débris, left behind by the running waters in consequence of their greater weight, are here found on the rock at a relatively slight depth below the vegetable humus.

Beyond the Sierra Nevada, the rich Californian plains are still separated from the Pacific Ocean by another chain appropriately named the Coast Range. This orographic system begins in the extreme north-west corner of the Union opposite to Vancouver Island, which might be regarded geologically as a marine fragment of the chain. In the peninsular region formed by the ocean, Juan de Fuca Strait and the labyrinthine waters of Puget Sound, Mount Olympus rises in almost isolated majesty to a height of 8,138 feet. The group so named consists in reality of three wooded ridges disposed in the direction from north-west to south-east, and is continued southwards through Oregon by a single dividing chain, which, however, is pierced both by the Chehalis and the Columbia Rivers. Beyond the Columbia estuary the Coast Range acquires greater regularity, but is still far inferior in altitude to the Cascade Mountains and the Sierra Nevada, of which it might be regarded as little more than an advanced rampart, with a mean elevation scarcely exceeding 3,000 feet. Here the Umpqua, the Calapooya, the Rogue River and Siskiyu Hills follow from north to south, but in strange disorder, their crests intermingling at several points, while in the neighbourhood of Mount Shasta some of the lateral ridges within the Californian

frontier merge in the Sierra Nevada. The Coast Range does not again assume distinct shape until it reaches the latitude of Cape Mendocino, westernmost headland of California. In this region of California the two orographic systems are sharply divided by the deep valley of the Sacramento River. The western range, ramifying into several ridges, falls gradually southwards, and terminates at San Francisco Bay in sharp headlands, spurs of Mount Saint Helena (4,350 feet) and of the Tamalpais Peak (2,600 feet).

So far the Coast Range is characterised chiefly by eozoic and cretaceous formations, here and there underlying rocks of more recent origin, and elsewhere covered by much erupted matter, while the original granite core also crops out in numerous jagged crests. In the river valley, near San Francisco Bay, and especially in the vicinity of Napa, copious thermal springs, sulphurous or saline, well up from the igneous rocks, and masses of mud still simmer in the vaporous "fire-holes." But there is nothing to justify the name of geyser that has been applied to these jets of vapour and water. The springs, which shoot up with a hissing sound to a height of 15 or 20 feet, are not intermittent, while their mean temperature scarcely exceeds 100° Fahr. The fumeroles, also, do not act spontaneously, but only when disturbed by breaking in the upper crust of the ground. Altogether the underground energies have here been reduced to a few insignificant displays.

Beyond the break at San Francisco Bay, the Coast Range system is continued south-eastwards to its junction with the Sierra Nevada. The Monte Diablo (3,860 feet), a first ridge of metamorphic rocks, rises above all rivals at the angle of the peninsula comprised between the two secondary inlets of the bay, and gives birth to the Contra Costa chain, which follows the south-easterly trend of the shore-line. Mount Hamilton (4,450 feet), one of its prominent crests, has become famous as the site of the Lick Astronomic Observatory. Rising into the higher atmospheric regions far above the hazy plains, this summit affords a grand panoramic view stretching from the blue Pacific across the sunny landscapes of the Californian valleys to the snowy crests of the Sierra. Nevertheless, Hamilton is not the highest summit, being exceeded by the culminating mass of San Carlos (5,470 feet), which lies farther south, and which takes the form of a somewhat arid terrace furrowed by divergent gorges. Other ridges are disposed in parallel lines along the coasts or in the vicinity. Although separated by long intervening valleys, these form collectively a broad upland border to the southern plain of California traversed by the San Joaquin River.

East of Point Conception, where the coast abruptly trends round to the east to form Santa Barbara Bay, the coast range and the Sierra Nevada converge in the crests of Mount Pinos (6,500 to 8,000 feet), which are crossed by numerous passes. The two systems are here merged in one range, presenting common features and contrasts from which it is scarcely possible to determine the exact point where the transition is effected. But the crest, which is continued south-eastwards beyond the point of convergence, must be regarded as on the whole a prolongation rather of the Sierra Nevada than of the Coast Range. The chalk formations prevailing in the latter here give place to granites which have the

same origin as those of the Sierra. Moreover, the mountains themselves increase in elevation, as if to rival the crests of the inner range. The San Bernardino, which is the Grizzly Peak of the Anglo-Americans, attains a height of 11,620 feet; like Whitney, it is visible nearly from base to summit, from the Mohave Desert on the east, and on the south from the Coahuila Valley, which falls below the level of the Pacific Ocean. The San Bernardino ridge is continued in the direction of the Mexican plateau, under the name of the Chocolate Mountains, which are skirted towards the south-east extremity by the Colorado above its mouth at the head of the Gulf of California. Farther west the San Jacinto and other ridges follow in parallel lines as far as the coast. The islands which stud the neighbouring waters are themselves disposed in chains parallel with those of the mainland. Thus the islands enclosing the Santa Barbara Channel on the south have the same trend as the Sierra de Santa Iñez facing them on the adjacent coast. Farther south the elongated islets of Santa Barbara, San Nicolas, San Clemente, and Santa Catalina also run in the same direction as the Sierra de Santa Ana on the neighbouring seaboard. The line of 500 fathoms roughly skirts the submerged bank on which stand these rocky archipelagoes.

A few springs of mineral oil bubble up to the surface of the sea some distance from the Californian coast; one has been discovered west of Santa Barbara, within a mile or so of the shore. Several others occur north of Cape Mendocino at distances of from three to five miles off the mainland. Along the whole coast from Monterey Bay to San Diego, the old marine levels rise in a succession of terraced beaches to over 300 feet above the present shore-line.

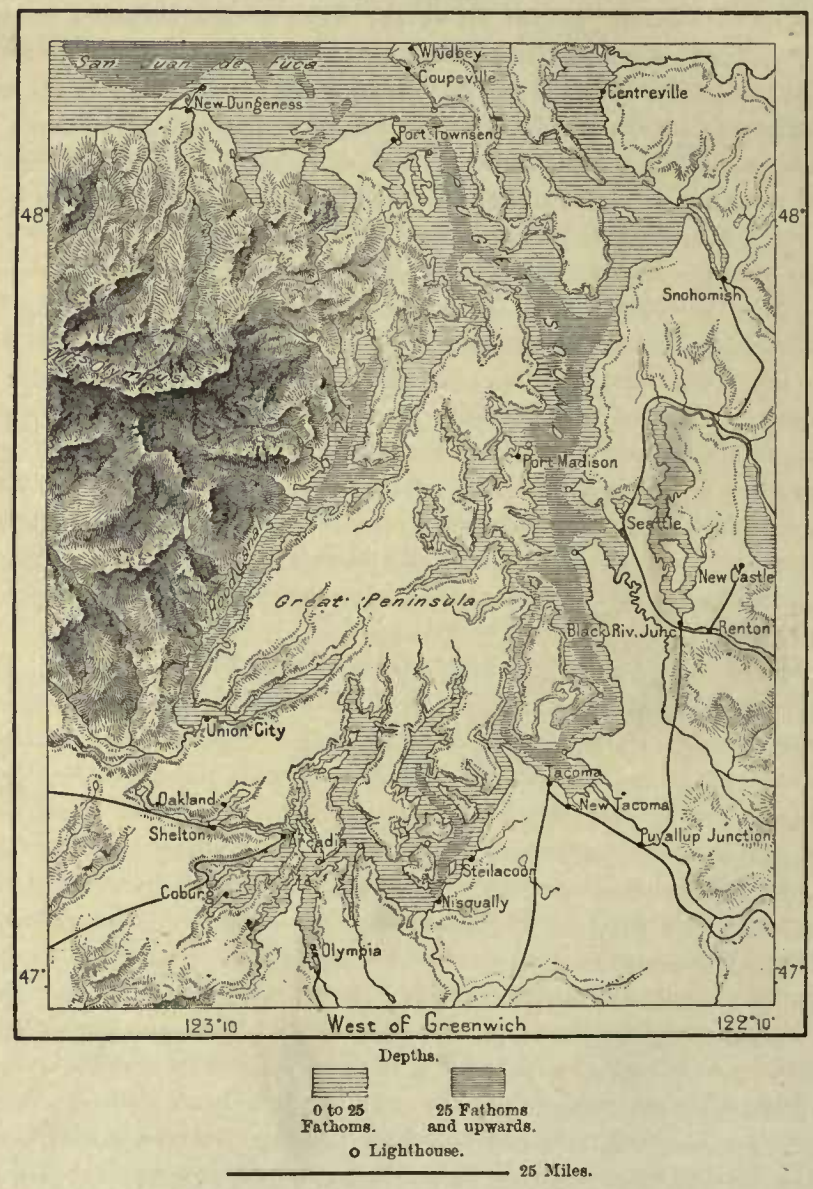
II.—Rivers, Lakes, and Closed Basins.

Of the region draining towards the Pacific Ocean the best watered section is the little basin which is disposed in semicircular form round about the inlet known as Puget Sound, between the Cascades and Coast Ranges. Here, however, there are no great rivers; but every little upland valley sends down its noisy torrent, while every watercourse on reaching the marine plain assumes the aspect of a broad stream or estuary. The Skagit, largest of these coast streams, has its source in British territory, and after a course of 140 miles enters the sea through two navigable mouths. When the white settlers first reached this district, the Skagit, which forces its passage in a deep cañon 20 miles long right through the Cascades range, was found to be completely obstructed for a distance of a mile and a half by a mass of snags carried down with the current. Most of the other rivers also enter the sound through broad estuaries, which are all accessible to shipping, and which thus increase the vast network of deep navigable waters presented by the labyrinth of passages, channels, straits, creeks, and inlets of every description, diverging in all directions round the Puget basin. Surveyors have estimated at no less than 2,000 miles the collective length of all the waterways open to large vessels in this land-locked sea, with its innumerable ramifications penetrating in a straight line for a distance of about 80 miles into the interior of the continent. In many places the face of the

encircling cliffs is washed by deep water, so that the largest ships are able to ride at anchor close to the shore. The main channel itself has in some parts a depth of no less than 200 fathoms. Numerous wooded islands mask its creeks or are dotted over the surface, while a large peninsula with a narrow neck a little over

Fig. 174.—Puget Sound.

Scale 1 : 1,100,000



a mile broad occupies about one-half of the sound, leaving between its shores and those of the mainland an intricate system of winding passages. This peninsula, which projects in the direction from south to north, is continued still northwards by the large island of Whidbey, lying at the entrance of the sound. Whidbey is itself separated by other passages from the archipelago of San Juan.

But while the inlet is studded with islands, the surrounding lands are by way of compensation strewn with lakes. A slight change of level in either direction would be attended by great changes in the contours of the shore-lines. Such shiftings have already taken place, and geologists have shown that the channels were at one time filled with glaciers carrying in their onward march the masses of detritus now strewn over the surrounding plains and slopes. It has also been ascertained that round about the shores of the sound the waters have formed successive terraced beaches far above the present marine level. But subsidence is supposed to be now followed by the reverse process of upheaval.

Between Puget Sound and the course of the Columbia, the Chehalis is the only stream reaching the Pacific. Its headwaters are intermingled with those draining to the sound, and many old lacustrine depressions now traversed by the Chehalis and other rivers belonging to both slopes have been transformed to natural park-lands dotted over with thickets, clumps of pines and oaks. The natives were themselves already quite aware of the fact that these basins had been recently upheaved, and they show the beaches and regular water marks along the margin. But what they could not explain, and what long remained a puzzle to the white settlers, are the round knolls, about 30 feet wide, and six or eight feet high, which are dotted in multitudes over the prairie. They are certainly not barrows or graves, for none of them contain any human remains; nor are they the warrens of burrowing animals, for no trace of galleries has anywhere been discovered; nor again can they be regarded as mounds deposited by mineral springs, for they consist neither of mud nor incrustations. All these knobs are composed of sand and gravel, showing no sign of stratification or of human labour. Alexander Agassiz supposes them to be sub-lacustrine buttes raised during a long series of years by a certain species of fish which here deposited their spawn. Formations of this kind may still be seen in the lakes of New England.

The Columbia Basin.

On the Pacific slope the most copious watercourse, thanks to the extent of its basin and to the abundant rainfall, is the Columbia, which, however, is not entirely comprised within the United States frontier. Nearly the whole of the northern section of its basin lies, in fact, in the Dominion of Canada, where it is formed by the isolated group of the Selkirk Mountains. Both the upper Columbia in the north and the Kootenay fork in the south have their sources in the same lacustrine and marshy depression, where they are connected by a navigable canal. Then, after a curiously winding course of 430 miles, they complete the circuit of the Selkirk range, uniting their waters in a common stream a little north of Fort Shepherd on the United States border. At Fort Shepherd itself, the main stream is joined by Clarke's Fork, a very copious affluent, which has sometimes been regarded as the main upper branch of the Columbia. Clarke's Fork, formed by the junction of two considerable streams, Hellgate and Flathead, both rising not far from the upper sources of the Missouri, traverses the romantic Lake Pend d'Oreilles (Kulluspelm), and then flows north

through an avenue of mountains to the left bank of the Columbia. Below the confluence the narrows of Little Dalles, not more than 160 or 170 feet wide, are followed by a few rapids, beyond which the Columbia plunges over a cascade 24 feet high, which, from its seething waters, has been named the Kettle Falls.

Lower down the Columbia is joined at the Great Bend by the Spokane, a considerable tributary from the east, which, after its issue from Lake Cœur d'Alène, tumbles over some beautiful cascades. Below this confluence, the main stream

Fig. 175.—Missouri-Columbia Divide.

Scale 1 : 7,000,000.

has still to force its way in narrow gorges through the various ranges which, being disposed in the direction of the meridian, obstruct its course to the sea. Several breaches were thus opened in the different ridges comprised between the two border ranges of the Rocky Mountains and the Cascades. But the latter chain presented a more formidable barrier, which long retained the inner waters of the plateau, where they accumulated in vast lacustrine basins. One of these basins formerly occupied a space of about 16,000 square miles to the east of the

northern Cascades under the same latitude as Puget Sound. The lake, fed by the Columbia or Spokane, has long been discharged, its dry bed now forming a vast lava-field, which has to a great extent been levelled by the waters, though its

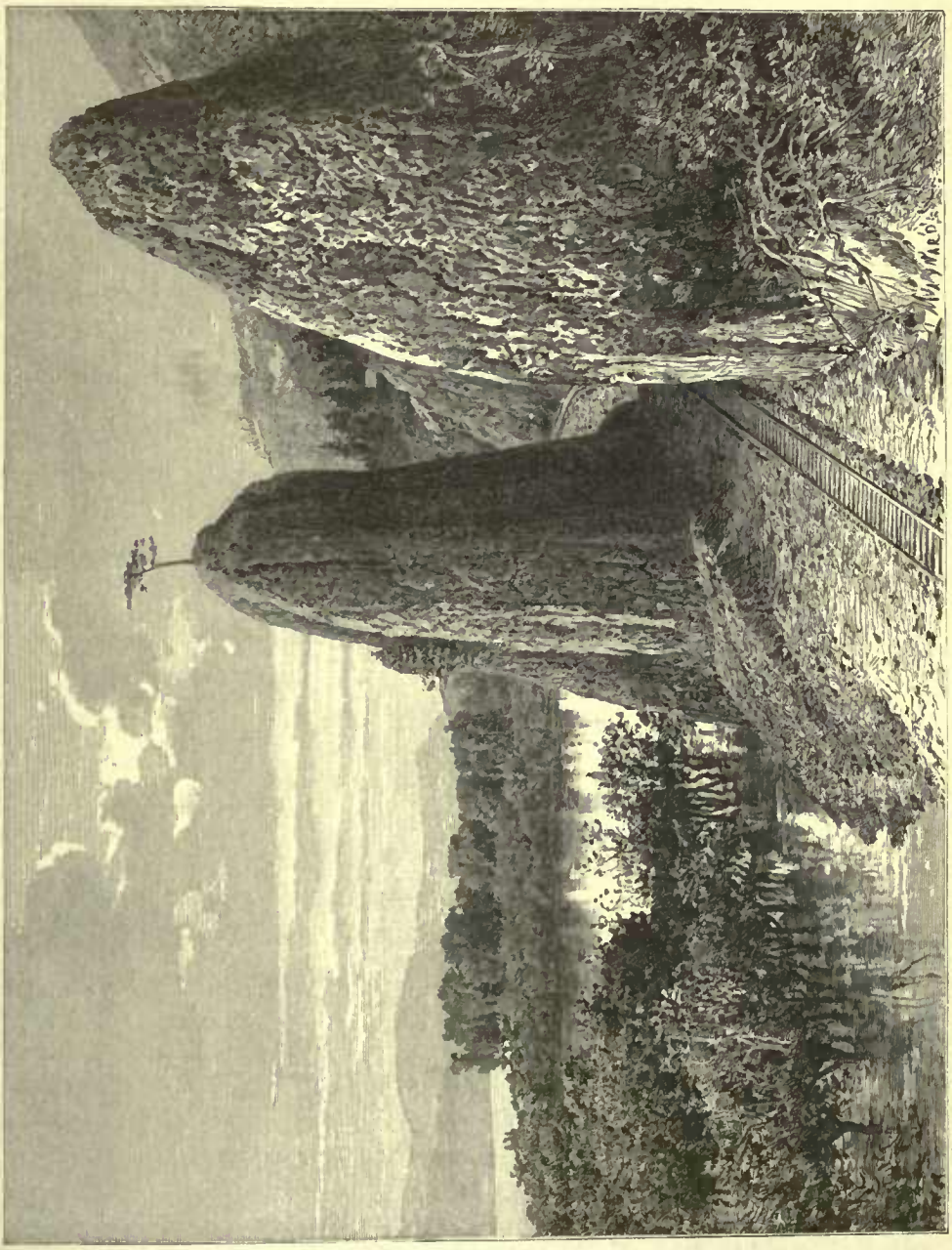


Fig. 176.—The Columbia—View taken at the Foot of Mount Hood.

central cavity is still flooded by Moses Lake, a closed basin fed by a few small affluents. In the thickness of the lava plateau have been excavated several winding gorges, forming so many river-beds, or coulées, as they are still called, though the channels are now dry and saline. Such is the Grand Coulée,

a glen with an average breadth of three miles, flanked with basalt walls about 800 feet high, and affording abundant pasturage for magnificent herds of cattle.

Above the breach where it issues from the plain, the Columbia is joined by its great affluent from the south-east, the Lewis or Snake River, the Sahaptin of the natives, also called the South Columbia. Like the Columbia, the upper Snake basin is to a large extent the bed of an old lake, which stretched for a distance of over 370 miles east and west, across the whole of the state of Idaho and nearly to the middle of Oregon. This plain, levelled by the waters, has an average breadth of over 60 miles from north to south. Nowhere are seen any lofty summits, the surface of the dried-up basin being broken only by some low eminences of archæan formation, with here and there a few eruptive cones, which probably at one time appeared as archipelagoes above the waters. The history of this lacustrine basin is related in broad outline by the sands, clays, and the silicious incrustations on some of its beaches, all showing that it was a freshwater lake, rich in animal life and especially in molluscs. Fishes of the cyprinoid or carp-like family abounded, as did also the ganoids, analogous to the "armed fishes" still surviving in the Mississippi. Trees of a semi-tropical flora shaded the shores of the lake, whose waters were drunk by elephants, camels, and equidæ. The desiccation of the lake was the result of the changed climatic conditions, which transformed the old lacustrine depression into a grey arid plain, where the sands alternated with patches of wormwood. While these modifications of climate were in progress, the fringe of volcanoes on the eastern margin of the lake ejected those lava streams which cover such a vast space in the Columbia basin.

The headwaters of the Snake River, which intermingle in the upland depressions of the Rocky Mountains with the main branches of the Missouri, Yellowstone, and Colorado Rivers, converge from the north, east, and south-east towards the centre of a vast amphitheatre, developed on the south-west side of the Yellowstone National Park. Here they all merge in a single channel, which forms a copious torrent when swollen by the melting snows, especially in the months of June and July. One of these upland streams takes the name of the Snake River from its very source in the heart of the Wind River Mountains. Here it rises on the slopes of Union Peak, and, after winding round the group of the Tetons, escapes through deep gorges to the lower reaches. At the Upper Cañon above Teton Pass (8,464 feet) it is joined on its right bank by the Grosventre Creek, which is formed by the junction of two torrents flowing from Fremont Peak (13,570 feet) and Union Peak, on the crest of the Wind River Mountains, which here form the Continental Divide.

Henry's Fork, another of the headwaters of the Snake River, issues from a marshy lake, whence the traveller may reach the sources of the Madison, affluent of the Missouri, through Taghee Pass (7,063 feet), which rises not more than 590 feet above the torrent. North-west of Lake Henry, a long fissure, flanked by volcanic walls 660 feet high, is flooded with the waters of Cliff Lake, another basin with numerous branches ramifying like the arms of a starfish. This lake has no visible outlet, nor is it known in which direction its overflow escapes,

whether under the basalts towards the Madison or to the Snake River. In the plain to the south-west the Godin or Lost River, another of these mysterious watercourses, disappears in a fissure in the lava-field, and the waters thus engulfed seem to reappear about 36 miles farther down, where copious springs well up in the very bed of the Snake River. Other galleries formed in the layers of hard scoriæ by the discharge of lavas at a high temperature, serve as underground channels for the Camas River and Medicine Lodge River.

Below the junction of its numerous headstreams, the Snake River first trends southwards, then to the south-west, through the old lacustrine basin now filled with basaltic lavas. Farther west it continues to describe the complete semicircle by which a junction is at last effected with the Columbia. During its descent from the upper cirque the current cuts its bed deeper and deeper into the basalt layers, and towards Rock Creek, where it bends farthest to the south, the lava walls between which it has carved itself a passage rise to a height of over 650 feet. But the river has not yet cut deep enough to acquire a uniform flow. The upper course had already been interrupted by several falls, and at this point, the level of the fluvial channel is suddenly lowered 150 feet by another cataract, the grandest occurring along its whole course. Up to the very brink of the precipice the plain maintains a perfectly horizontal position, and beyond the chasm it is seen still to continue at a dead level. After breaking against some rocky ledges and winding between trachyte islets, the current plunges bodily into the abyss over a horse-shoe dyke like that of Niagara. Such are the famous Shoshone Falls, which are scarcely anywhere surpassed for gloomy grandeur, heightened by the utter desolation of the surrounding igneous region.

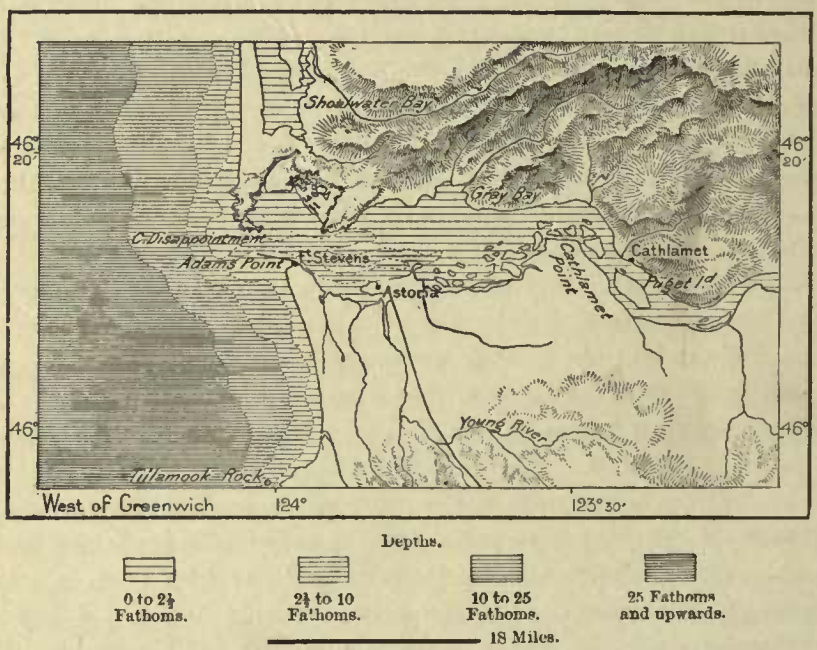
Ravines, mostly waterless like the Arabian wadies, reach the deep cañon of the Snake River at intervals. Here the chief affluent is the Owyhee, which joins the left bank of the main stream at the point where, bending round to the north, it leaves the old lacustrine basin and enters the hilly region dominated westwards by the chain of the Blue Mountains. The Snake River then flows in a longitudinal fissure for a distance of about 200 miles, receiving from the Rocky Mountains the two large affluents known as the Salmon River and Clearwater. Farther on it enters the lower plain, where it is deflected westwards to its confluence with the Columbia descending from the north. But before the junction the Snake is joined by the Palouze, the "Rivière aux Pelouses" of the Canadian trappers, which is noted for a superb cascade nearly 100 yards high. A few miles above the mouth of the Snake the Columbia receives the Yakima, descending from the slopes of Mount Rainier.

Nearly all the running waters of the Columbia catchment basin are collected in the common channel, which below the Snake confluence takes its final westerly course to the Pacific Ocean. But although here over 1,000 yards wide and not more than 400 feet above sea-level, the Columbia has not yet acquired the normal tranquil motion of a river which has reached its lower course. There are still obstructions to overcome even before the Cascades Range is reached. The first abrupt descent to a lower level occurs at the Chuttes or Deschuttes cañon, where the

Columbia, confined between narrow basalt walls, dashes against a natural causeway of huge boulders. The affluent which here joins the main stream from the south after skirting the east foot of the Cascades, and tumbling over several cataracts, has received from the Franco-Canadians this name of Chuttes (properly *Chutes*, or "Falls") from the swirling waters of the Columbia at the confluence. In the same way the Cascades Range itself takes its name from the series of rapid inclines by which the Columbia falls to a lower level during its passage through this rocky barrier. It penetrates first into a gloomy gorge whose huge blackish basalt walls have been slowly sawn through by the current in the course of ages. At the narrowest part of the Dalles, as this gully is called, the distance from

Fig. 177.—Mouth of the Columbia.

Scale 1 : 1,000,000.



bank to bank is not much more than 50 yards; but during the freshets the stream gains in height what it loses in breadth, rising at times as much as 60 feet.

About 30 miles lower down the Columbia rushes tumultuously down the Cascades properly so called, a series of dangerous rapids flanked by the steep escarpments of lava cliffs ejected by the neighbouring volcanoes. The upper fall, over 16 feet high, is continued for a space of three or four miles by a succession of cataracts where the angry waters rush with a deafening roar over their rocky bed. The natives assert that the lower falls of the Columbia are of recent formation. Formerly the stream would appear to have flowed tranquilly beneath an enormous basalt archway spanning the gorge like the Natural Bridge of Virginia. Then this gateway is reported to have collapsed during an eruption of Mount Adams, its fragments building up a rocky island athwart the current, and thus compelling the river to raise its level and to broaden out higher up. This traditional

origin of the cascade is rendered plausible by the fact that above the fall the observer may detect beneath the waters of the Columbia the remains of a spruce forest (*abies Douglassii*), whose stems are still firmly rooted in the ground. At present the falls are turned on the south side by a ship canal, constructed along the base of an elevated talus, which is known by the name of the "Travelling Mountain," and which in fact does "travel," owing to the sands of its lower strata moistened and carried along by the underwash.

Below the cascades and the isolated basalt headland of Cape Horn, the Columbia enters its lower unobstructed course about 100 miles from the Pacific. From the south the Willamette (formerly Wah la math), also navigable in its lower reaches, descends from fall to fall, bringing the contributions of the longitudinal valley comprised between the Cascades and Coast Ranges. At the Willamette confluence the main stream, here some miles broad, is already a tidal estuary. After another bend round to the north in search of an opening through the Coast Range it enters the sea through a broad mouth obstructed by sandbanks. But the bar may now be crossed at high water by large vessels keeping to channels which were extremely dangerous until they were carefully buoyed. Such is the labyrinth of banks and shoals in the inner bay of the Columbia, that in 1788 the English navigator, Meares, after successfully crossing the outer bar, failed to discover the mouth of the river, and even ventured to deny its existence.*

Two streams of small size, the Umpqua and the Rogue River, the latter so named from the Klamath Indians of evil repute who formerly dwelt along its banks, take their rise on the western slope of the Cascade Range, and have to pierce the Coast Range in order to reach the Pacific. The Klamath, a much larger watercourse, has its source at a far greater distance from the sea on the plateaux stretching east of the Cascades. It issues, under the name of the Sprague, from one of those lakes which still flood the depressions of the plateau, and after traversing the chain of the upper and lower Klamath lakes extending along the east slope of the hills, escapes seawards through a break in the range south of the transverse ridge of the Siskiyu Mountains.

The Sacramento and Colorado Basins.

The deep channel known as the "Golden Gate," which gives access from the ocean to the bay and harbour of San Francisco, also serves as the common estuary for all the running waters of the great hill-encircled plain of California. Hence the innumerable mountain torrents, streams and rivulets descending from the slopes of the Sierra Nevada and Coast Range are collected by the two main arteries of the Sacramento and San Joaquin, which flow one from the north, the other from the south, and merge in a single channel near the head of the bay. The Sacramento rises in the neighbourhood of Mount Shasta at the northern

* Hydrology of the Columbia River:—

Approximate length	1,300 miles.
Area of the catchment basin according to Gannett	214,000 sq. miles.
Approximate discharge	212,000 cubic feet per second.
Navigable course (without the affluents)	570 miles.

extremity of the depression which forms the axis of the valley. But the Pitt River, its largest affluent, longer than the main branch itself, has its sources far to the north-east, where it issues from the lakes lying east of the Klamath basins and south of the sage-plains of Oregon. Goose Lake, farthest reservoir of the basin, is intersected by the conventional line forming the common frontier of Oregon and California. After leaving the southern extremity of this lake the Pitt flows south-west across the vast lava-fields and scoriæ, between Mount Shasta and Lassen Peak, to its junction with the Sacramento, which is here already a copious stream. Lower down every upland valley of the Sierra Nevada and the Coast Range sends down its auriferous torrents, such as the Plumas, or Feather, the Yuba and the American, all famous for their gold washings, far more productive than the auriferous sands of Pactolus. In its lower course the Sacramento wanders almost aimlessly over the nearly level plain, leaving to the right and left a network of annular lakes and bayous, and with every freshet shifting its channel.

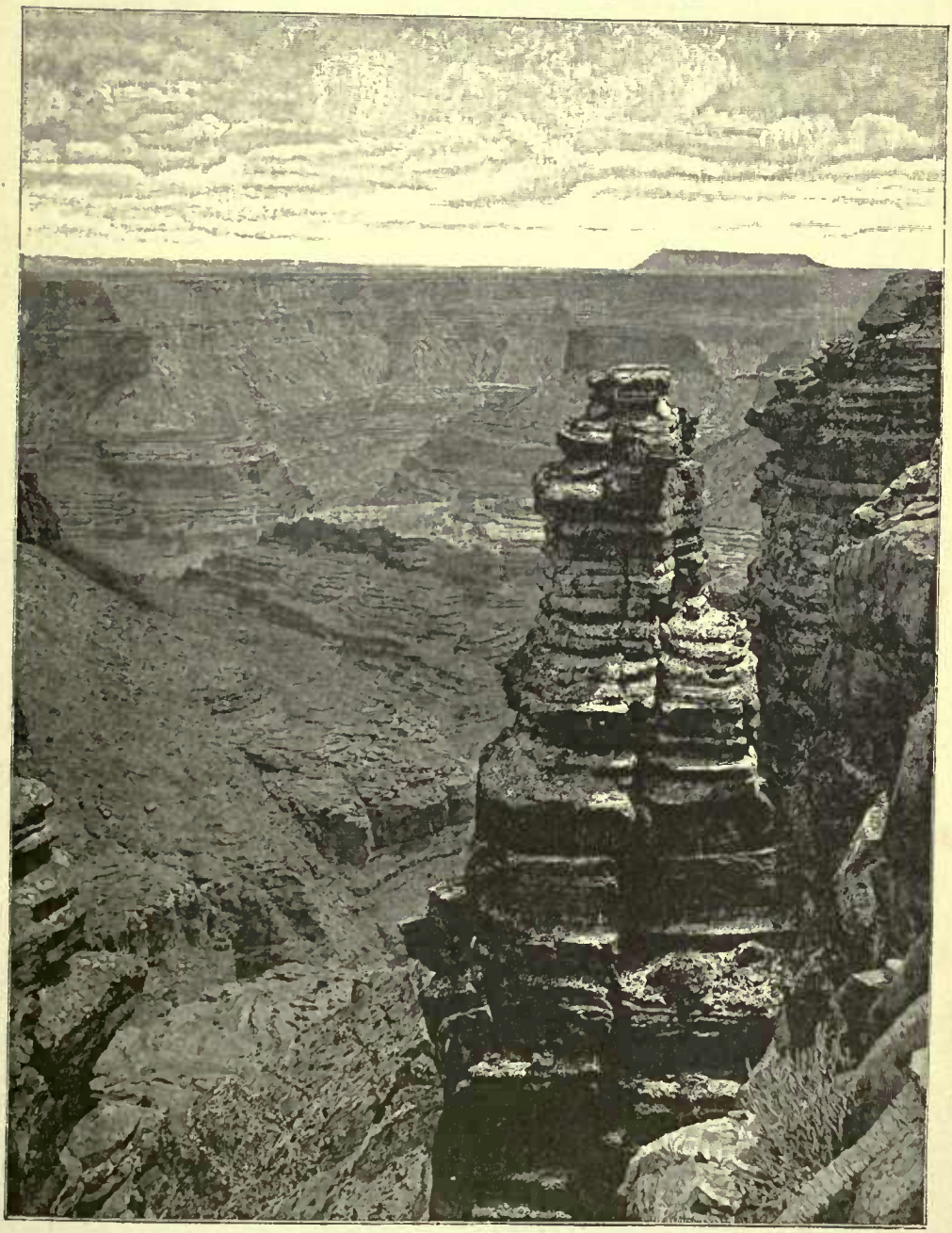
Fig. 178.—Sources of the Colorado.

Scale 1 : 350,000.

The San Joaquin, which flows through a less rainy region than North California, rolls down a correspondingly smaller volume and has a considerably shorter course than the Sacramento. The section of its valley where it forms a perennial stream begins south of Mount Lyell in the Sierra Nevada, beyond which the torrent makes a long bend towards the central valley, and thus reaches the common outlet. The San Joaquin basin varies in extent with the seasons. After a period of heavy rains it receives an affluent from Tulare Lake, and from several

other lacustrine basins within the circuit of the South Californian mountains. But during long droughts the emissary dries up, and Tulare itself, as well as the other neighbouring depressions, becomes a closed basin, in which the water

Fig 179.—The Marble Cañon, Colorado River.



gradually evaporates, decomposing the lake into several secondary pools. The geological survey of the whole region shows that a general process of desiccation is in progress. Formerly Tulare sent a permanent emissary to the San Joaquin

basin; now it is intermittent, and the time is approaching when it will cease altogether, and Tulare become a closed basin.

South of San Francisco Bay the coast streams are mere wadies with very little water in their beds. In the south-western region of the United States the chief waterway is the Colorado, which discharges, not directly into the Pacific, but to the head of the "Vermillion Sea," or "Californian Sea," now called the Gulf of California. This great artery—great, at least, for the length of its valley—does not take its Spanish name of Colorado, that is, the "Ruddy" or "Red River," except in its middle and lower course, whither the Spaniards had penetrated at an early period; its upper forks, not having been explored till recent times, have received other names. The Green River, northernmost of the main branches, rises in the Wind River Mountains on the flank of Union Peak, that is, at the Continental Divide. At first a simple mountain torrent, the Green River, swollen in its upper valleys by the melting snows, descends from an altitude of over 6,000 feet, and for a great distance flows at a mean elevation of 5,000 feet on the plateaux, which were formerly flooded by an inland sea. From this basin it escapes through deep gorges, successively piercing the Uinta Mountains and the Roan Cliffs. Lower down its volume is nearly doubled at the head of a rocky cañon by the Grand River, the other great headstream of the Colorado, which descends from the metalliferous uplands of Middle Park in Colorado.

At the confluence of the two forks, the united waters, henceforth known as the Colorado, continue to excavate deeper and deeper the famous Grand Cañon, the type in a pre-eminent sense of these rocky river gorges. The Spanish term, *cañon*, introduced by the Anglo-Americans into the nomenclature of physical geography, is at times indifferently applied to gorges which differ greatly in their origin and general aspect. But strictly speaking, it should be applied only to those defiles which have been gradually scooped out by the current alone without the aid of rain or other meteoric agencies. The cañons properly so called scarcely occur anywhere except in regions where the rainfall is very slight. This class of gullies is normal in the Rocky Mountains and on the plateaux comprised between the eastern and western border regions of that system, whereas in other regions, notably in the calcareous mountains of the Jura, such formations are due to local causes. The typical cañon is always formed by copious upland torrents, which are fed by the melting of heavy snows, and whose currents, descending from considerable heights, impinge with great force against the rocky barriers, through which they slowly cut a regular channel. The region traversed by these rivers being but slightly eroded by the rains, the action of the water takes place only in a vertical direction, eating its way through its own bed, and working, as with a pickaxe, downwards until it has reached its proper incline. At the same time upheavals of the ground may have also played their part in the production of these phenomenal excavations, the land rising and the river to the same extent falling to preserve its level. Capt. Clarence E. Dutton compares the process to the see-saw action of a saw cutting through a log which is raised by the platform of the drag. This is what appears to have taken place in

THE GREEN RIVER CAÑON.

the Colorado valley, where the river is older than the hills through which it has sawn its way.

Geographers have divided the great chasm into several secondary gorges, which have been named in descending order Cataract, Narrow, Glen, Marble, and Grand Cañon, this last the longest of all (about 220 miles). The northern section, south of the Kaibab plateau, is altogether unrivalled for the strange grandeur and wildness of its scenery. The bed of the current stands 5,000 and even 6,000 feet below the edge of its rocky walls, which, however, have not retained their vertical position. They have been eaten away to great depths in such a way as to form vast lateral cirques separated by bluffs or headlands, which rise like pillars or huge towers, girdled round with stratified rocks, all varying in size, slope, and colour. In this region of the river valley the cañon broadens out upwards, the distance from brink to brink varying from 5 to 12 miles. The enormous mass of rock now missing between the opposite escarpments has been completely swept away by the action of the stream. Nowhere else in the whole world can there be seen a river valley exhibiting the phenomena of erosion on a grander scale. The prodigious dimensions of the eroded chasms, the architectural arrangement of the stratified rocks, "Babels piled on Babels," the sharp sky-line of the cliffs standing out against the azure vault above, the brilliant tints of the rocks hidden by no patch of verdure, the fantastic forms affected by the colossal sculptures which adorn the imposing sandstone, marble, granite or lava façades—all combine to make up a picture varying with every hour of the day, with every turn of the stream, a picture of unrivalled grandeur and diversity of strange outlines. On reading their descriptions we begin to understand the expressions of wonder mingled with awe employed by the geologists engaged in the study of the Grand Cañon, those especially who have descended to the river bed, lost, as it were, in the bottomless pit while gazing on the gloomy current here and there still ruffled by reefs and rapids. So early as 1867 the miner White, pursued by Indians, had embarked with a companion on a raft, and committed himself to the unknown stream. His comrade perished in a whirlpool, but White succeeded in saving his life. Two years later Powell ventured also to embark on the perilous journey, drifting with the stream from the head to the outlet of the gorge. Twenty years afterwards some engineers repeated the exploit with a view to the construction of a railway along the bottom of the cañon. But the first attempt was unsuccessful. After losing their chief and two boatmen the exploring party had to make their way back across the plateau under great hardships to the point whence they had started. A few months after their return they again set out, with a fresh equipment of boats especially constructed for this strange voyage, and this time Stanton successfully navigated the river from Grand Junction, that is, from the confluence of the Grand and Gunnison Rivers, to the mouth of the Colorado, at the head of the Gulf of California.

In the stretch of 500 miles in the region of the cañons properly so called the river bed has not a single vertical break like that of Niagara. The total descent of 4,200 feet is decomposed into 520 cataracts, falls or rapids, like those of the

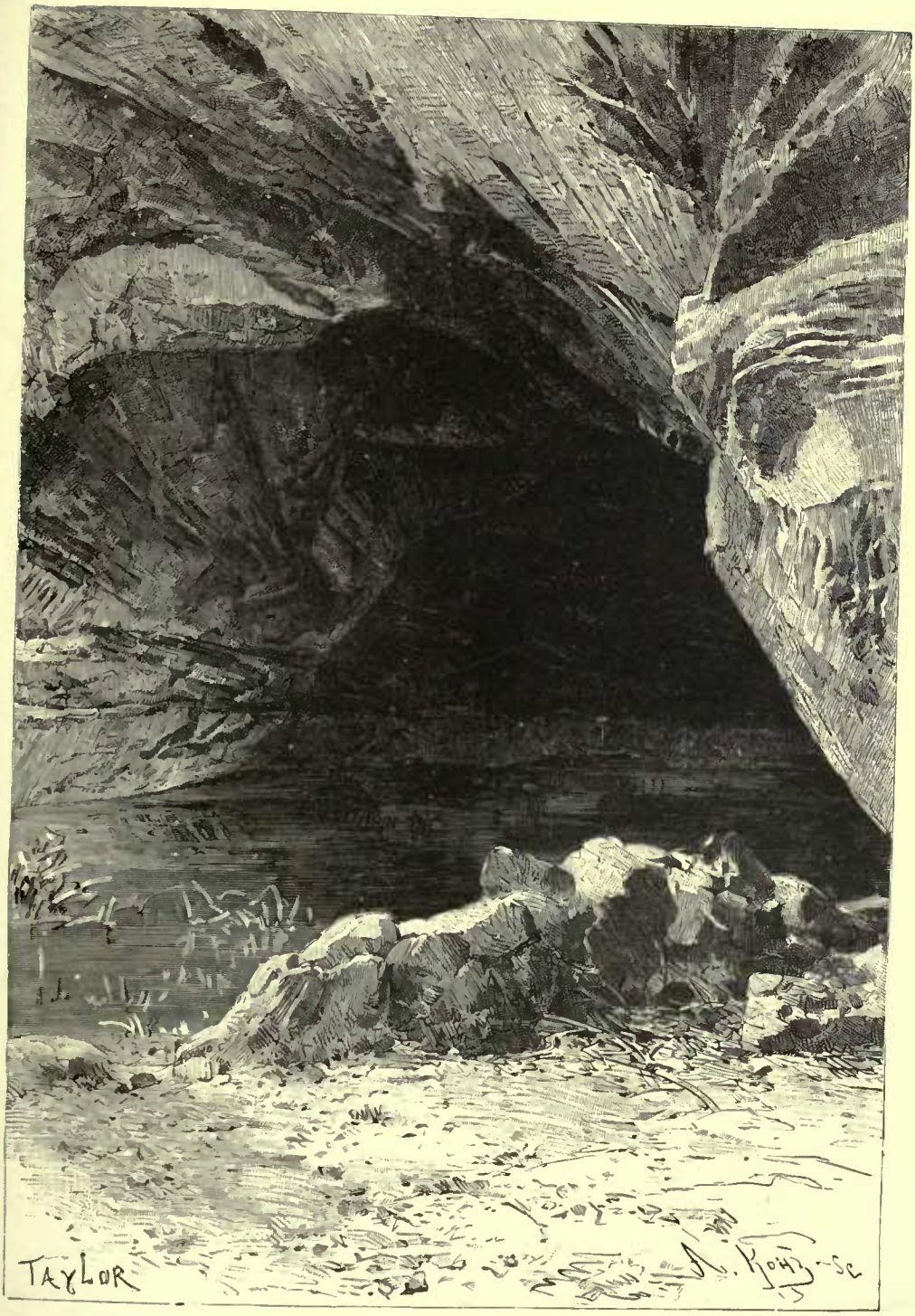
Nile, incessantly varying in form, direction and swiftness according to the level of the current from season to season. It would be impossible for any boat to shoot all these difficult rapids; in some places everything has to be landed and conveyed across the rugged portages with the boats themselves, unless these are allowed to drift down, to be fished up at the foot of the cataracts and all damages repaired. At present the boats and canoes have been mostly replaced by little steam launches that can be taken to pieces. During its course through the cañons, the Colorado is joined by some lateral streams, which also flow in deep channels across the plateau, and which at the confluences are dominated by angular or even pyramidal

Fig. 180.—Grand Cañon.

Scale 1 : 1,500,000.

bastions completely detached from the neighbouring terraces. The rocky plains have been carved into almost inaccessible isolated blocks of great size by the abrupt windings of these watercourses. The Little Colorado, one of the chief affluents in this section of the main stream, comes from the south-east, and after skirting the San Francisco volcano joins the Colorado between the Marble and the Grand Cañons. Lower down the Kanab Wash issues from caverns with imposing entrances below the Utah plateau, and plunges from chasm to chasm on its impetuous course to the deepest part of the Grand Cañon.

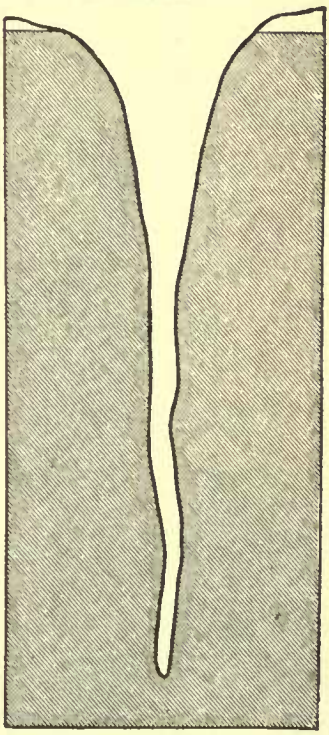
The Virgin River (Rio Virgen), which heads on the same plateau, is a more copious affluent. This watercourse, flowing in a fissure 2,300 feet deep, joins the



SOURCE OF THE KANAB WASH.

Colorado not far from the bend where the river, leaving the normal direction of the cañon from east to west, begins to flow southwards in the direction of the Gulf of California. A short distance below the Virgin confluence the Colorado at last escapes from its rocky entanglements and becomes navigable for steamers. It still glides between rocky walls and hills which here and there encircle green valleys, and farther on it rolls away across the argillaceous plateaux of the desert. Here the banks of the Colorado are skirted by semicircular depressions, lakes, and meres and saline flats, old beds of the river abandoned during the dry season, and occasionally reoccupied during the freshets. Recently one of these shallow basins was seen suddenly to rise and overflow its margin far and wide. It had been converted into a reservoir for the overflow of the main stream during the floods, by which an obstruction in the river bed had been swept away. The New River, a branch of the Colorado which is usually dry and indicated only by the shifting sands, skirts the southern spurs of the Chocolate Mountains, beyond which it trends westwards in the direction of the Coahuila Valley. This depression was an old marine bed which was deprived of its waters by evaporation, and descends in some places 200 feet below sea-level. On several occasions the Colorado has sent an effluent towards this lateral depression, which has thus been flooded by the overflow during the freshets. Such is the Indian tradition, repeatedly confirmed by the reports of explorers, and these periodical visits of the Colorado are further proved by the calcareous incrustations interspersed with fluviatile shells that have been deposited by the flood waters. Were the current to continue flowing in the direction of the old Coahuila depression, an inland sea would be created about 100 miles long and 25 miles broad. This lacustrine basin, nearly ten times larger than the Lake of Geneva, would soon become a saltwater reservoir, as there would be no outlet to carry off the excess of saline substances. Human labour, however, could easily regulate the discharge of the river by controlling the fertilising waters of the periodical inundations. Then the arid slopes of the old marine inlet would be transformed by irrigation to a zone of magnificent vegetation.

Fig. 181.—Section of the Rio Virgen.

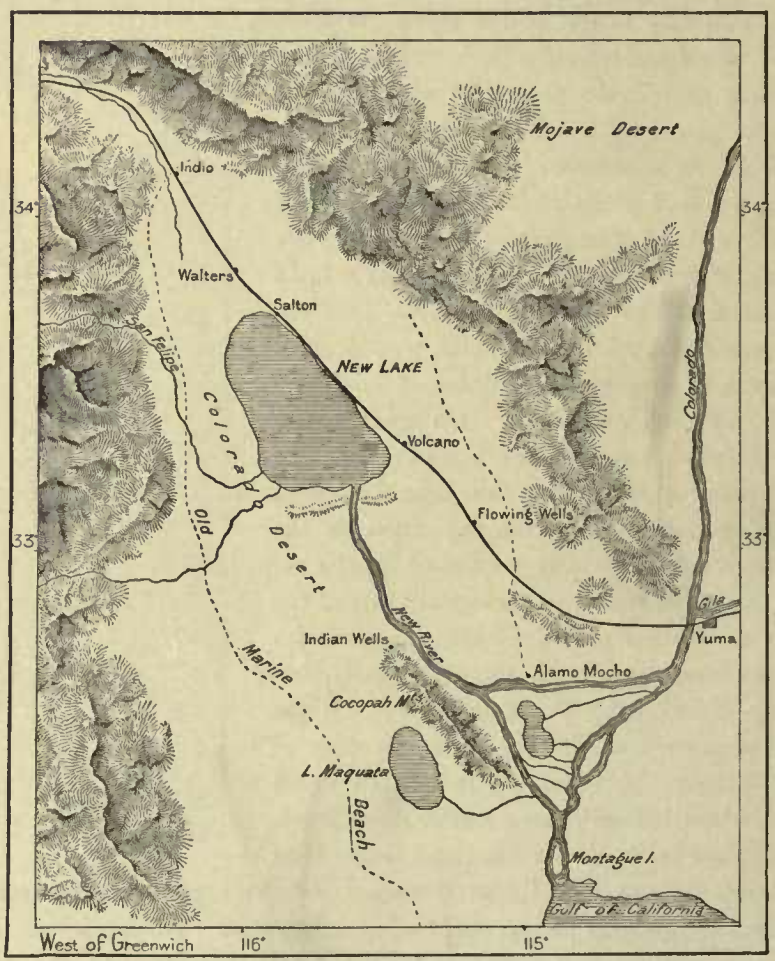


The Gila, the only large affluent of the lower Colorado, rises in New Mexico at a distance of over 380 miles in a bee line from its confluence. It receives a great number of affluents, but many of these watercourses, traversing a desert region where the rainfall is very slight, either flow intermittently, or else the current, when not actually exhausted, continues its course beneath the sands. Such is the Rio Santa Cruz, which takes its rise in the Mexican state of Sonora, and

then flows mainly north-west by Tucson, in Arizona. This river disappears several times under its sandy bed, reappearing when passing over rocky ground, and at last dying out altogether. The Gila itself loses much of its volume through evaporation, and as it receives no fresh contributions in its lower course, it reaches the Colorado in a very impoverished state; at the confluence it is only 50 yards wide, while the Colorado varies from 220 to 800 from bank to bank.

Throughout the whole of its lower course the Colorado flows entirely on a bed

Fig. 182.—New Lake in the Coahuila Valley.
Scale 1 : 2,500,000.



of shifting mudbanks, where the steamers plying up and down are constantly running aground. During the dry season the current scarcely exceeds a mean velocity of 2½ miles an hour; but it rises to five or six miles during the freshets, which begin in May or June, and which are at times most destructive. The Colorado has developed no delta. The estuary broadens out gradually towards the gulf in the shape of a regular funnel where the sandbanks are flooded to a depth of not more than 10 feet. The flow, which crosses this bar and which

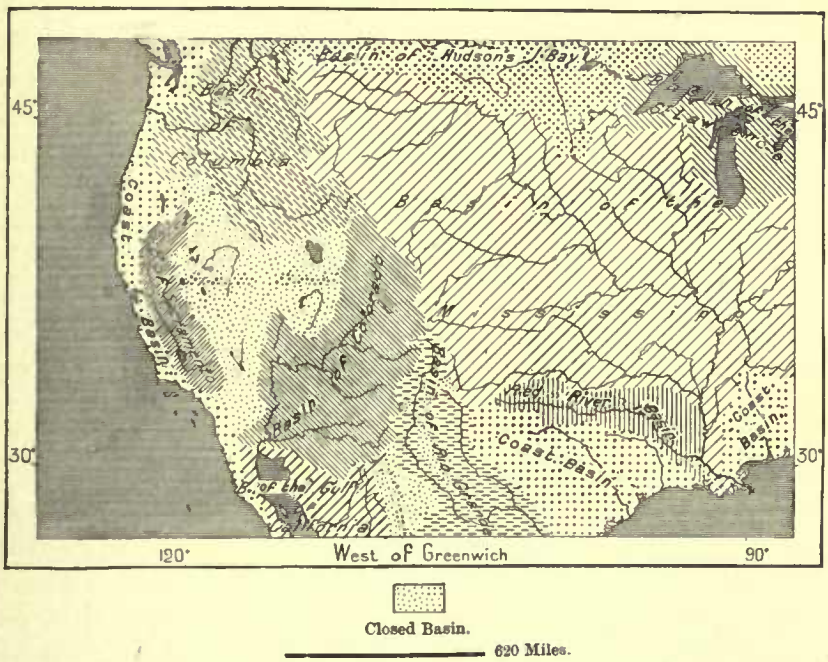
raises the level of the stream from 10 to 16 feet, and during the spring tides even to 20 or 30 feet, rushes up the channel in the form of a bore, the rollers, from 4 to 6 or 7 feet high, dashing furiously against the river banks.

It is somewhat surprising to find this lower section of the Colorado comprised within the limits of the Mexican republic, as if the Americans, when dictating the treaty of Guadelupe, were unaware of its importance. Yet it was already well known to the Spaniards, being the Rio de Buena Guia discovered by Alarcon in 1540.

Closed Basins.

Extensive tracts in the region of the Rocky Mountains have at present no outlet towards the sea; they form so many closed basins, nearly all, if not all, of

Fig. 183.—River Basins of the West.
Scale 1 : 37,000,000.



which belonged formerly to one or other of the river systems which drain to the surrounding oceans. In the north, that is, in the state of Oregon, these depressions are still in the transitional stage between isolation and fluvial outflow, so that a slight modification of climate in the direction of increased moisture would suffice to change the whole character of the hydrographic system. Numerous lakes still belonging to the Klamath, Sacramento, and Columbia basins would be transformed by a subsidence of a few yards to isolated saline reservoirs, like the Alkali Lakes and Abert Lake, this last named from one of the pioneer explorers of the plateau. Farther south the whole group of depressions where the evaporation is in excess of the supply has received from the explorer Fremont the name of the "Great Basin," although the general depression really consists of a multiplicity of smaller depressions in juxtaposition. This tract, absolutely destitute of

outlets, is disposed in the form of a triangle between the Snake River valley of the Columbia basin in the north, that of the Colorado in the east and south-east, and those of the various Californian coast streams in the west and south-west. Most of the distinct basins are separated by intervening mountain ridges which follow in échelon order on the plateau, and which give this region its characteristic aspect. The intermediate depressions are so many valleys communicating at intervals, or even coalescing in broad plains in the places destitute of mountain ranges. The altitude of the different sections varies greatly. Those of the north have a mean elevation of 5,000 feet, rising in the form of a saddleback between Pyramid Lake and Great Salt Lake, whereas the pedestal falls gradually southwards as far as the Coahuila Valley in Southern California, where the depressions stand at a lower level than the sea.

In a series of terraced tablelands it is often difficult to recognise the protuberances of the intermediate segments. Such is also the case in the Great Basin, which, viewed as a whole, presents very indistinct outlines. The western limit is clearly marked by the crest of the Sierra Nevada. In the east also it is sufficiently indicated throughout nearly the whole of its extent by the parallel ridges of the Wasatch Mountains. But towards the north and south there are numerous spaces where the waterparting is so uncertain and so indistinguishable by sight that it could be determined only by systematic levelling operations. In several plains this dividing-line of the waters still remains purely ideal, while elsewhere a single oscillation of the ground in either direction suffices to modify the contour-lines of the region of closed basins. From north to south the zone of internal drainage has an extreme length of no less than 830 miles, while from east to west the extreme breadth exceeds 500 miles. Gilbert estimates the total area at about 208,000 square miles, or rather more than that of France.

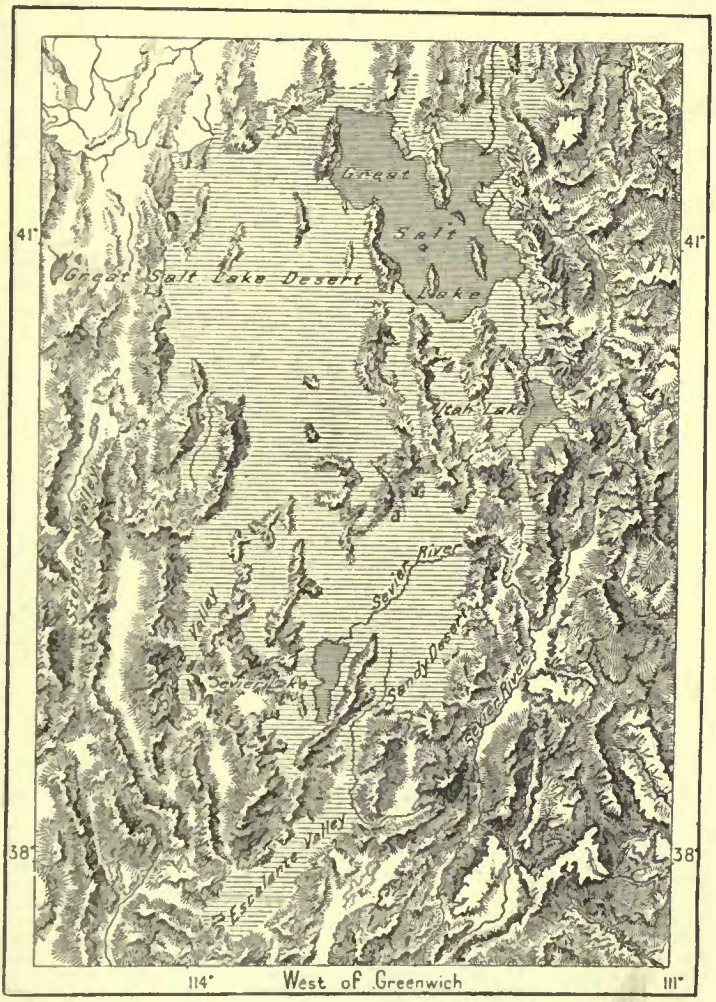
Amongst these contiguous depressions the largest occupies the north-east angle of the tableland, and its bed is still flooded with the shallow sheet of water known as the Great Salt Lake. But the basin of glacial waters which has received in a retrospective sense the name of Lake Bonneville, from one of the chief explorers of the plateau, was at least nine times larger than the Salt Lake of the present epoch. At one time it also included Lake Utah with the whole of the Jordan Valley, as well as Lake Sevier. The highest cliffs formerly washed by its waters stand nearly 660 feet above the present level of the Great Salt Lake. The sands of the beds are mingled with salts, and during the summer are covered with whitish efflorescences. The salinity of the water, at present so intense in the Great Salt Lake, has evidently gone on increasing during past geological ages from the time when Lake Bonneville, fed by the glacial waters of the encircling hills, was comprised within the Columbia catchment basin, and discharged its overflow through an affluent of the Snake River. Traces of this outflow may still be seen in the Red Rock ravine of the Cache Valley at the north-east corner of the old lake. Gilbert estimates the total surface of the bed formerly covered by a continuous sheet of water at about 19,750 square miles.

It has not yet been possible to determine the number of secondary depressions

which compose the "Great Basin," so slight is the elevation of some of the water-partings, but they probably number about a hundred. Each of these distinct depressions had its separate lake, or even still possesses it, though now reduced to a mere *playa*, a Spanish term retained by Anglo-American geographers, meaning a saline sheet, flooded or dry, alternating in size with the seasons.

Fig. 184.—Old Bonneville Lake.

Scale 1 : 4,000,000.



When the original lake was broken up into several separate basins, some, standing at different levels, communicated with each other through temporary channels, which gradually dried up with the subsidence of their reservoirs. Thus, when Lake Bonneville was decomposed into a northern and a southern basin, which are now represented by the Great Salt Lake and Lake Sevier, a copious stream flowed from the latter to the former. The bed of this river is still seen in the gorge winding between the Simpson Mountains on the east and the MacDowell range on the west; it is in some places 1,000 feet broad, and here and

there its banks are 5,000 feet apart. The channel is cut to a depth of 100 feet, yet not a single drop of water now remains in this ancient lacustrine affluent.

The whole of the north-eastern part of the old Lake Bonneville constitutes at present a distinct hydrographic depression embracing the Great Salt Lake and the other lakes and streams of its basin. The running waters descending from the Wasatch Mountains and watering a narrow zone of cultivated land at the west

Fig. 185.—Old River between the Two Basins of Lake Bonneville.

Scale 1 : 500,000.

Divide between the Great Salt Lake and Sevier Lake Basins.

12 Miles.

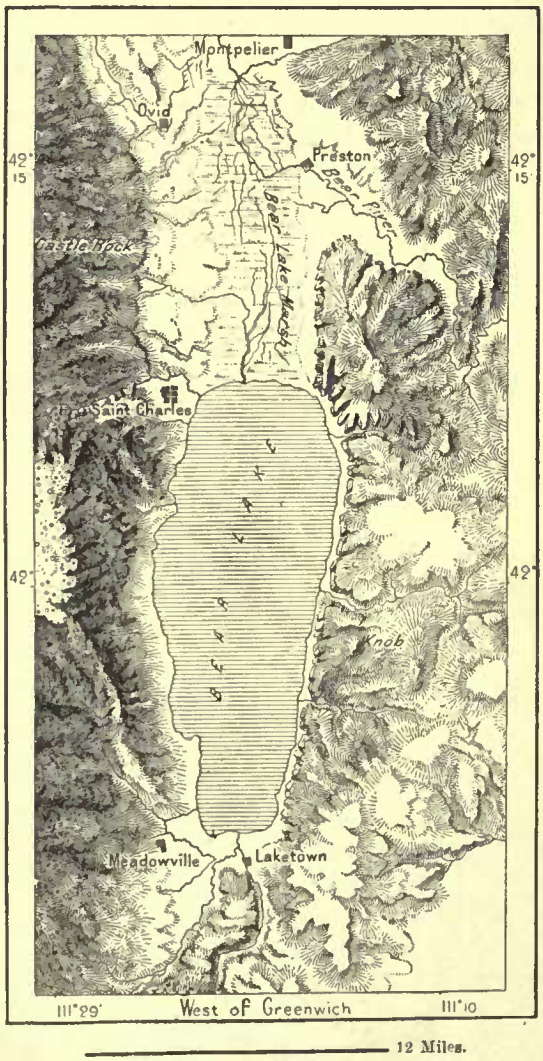
foot of that range, converge in the Provo River, which flows in the direction from south to north and falls into the triangular basin of Lake Utah. This basin, which gives its name to the state colonised by the Mormons, has a length of nearly 24 miles from north to south, and a width of 14 miles at its widest point, with an estimated area of about 130 square miles. It is limited westwards by the Great Salt Lake Desert, and although averaging not more than 14 or 16 feet in depth,

it remains quite fresh and is well stocked with fish. Trout especially is abundant thanks to the river forming its outlet, which has received the name of Jordan from the "Latter-Day Saints," who founded their New Jerusalem on its banks.

This "Jordan" of the Promised Land of the Far West issues from the north end of Lake Utah, and after a southerly course of nearly 40 miles measured in a straight line, falls into the Great Salt Lake at its south-eastern extremity. From the east side come also the other affluents, the Weber and Bear Rivers, both of which force their way right through the Wasatch Mountains. Weber River is remarkable as affording a gateway directly through the Wasatch Range, Echo and Weber cañons presenting some of the grandest scenery in the West. These cañons are utilised by the Union Pacific Railroad, which, after debouching on the east side of the Great Salt Lake, sends a branch southwards to the Mormon capital and then bends round the eastern and northern shores of the lake, crossing the Bear River a little above its mouth in the Bear River Bay. The Bear River, which has a remarkably winding course of about 450 miles, mostly in a narrow rocky bed between high escarpments, traverses from north to south the flooded depression of Bear Lake, a typical river valley lake. Formerly far more extensive than at present, it develops its graceful oval contour-lines between two parallel ridges, and is separated at its northern extremity by a semicircular beach of shelving sands from the swampy tract known as Bear Lake Marsh. The lake, which is about 20 miles long by 7 miles wide and nearly 180 feet deep, is a lovely sheet of water "set like an emerald in the mountains. Not even the waters of the Yellowstone Lake present such vivid colouring" (Hayden).

Fig. 186.—Bear Lake.

Scale 1 : 500,000.

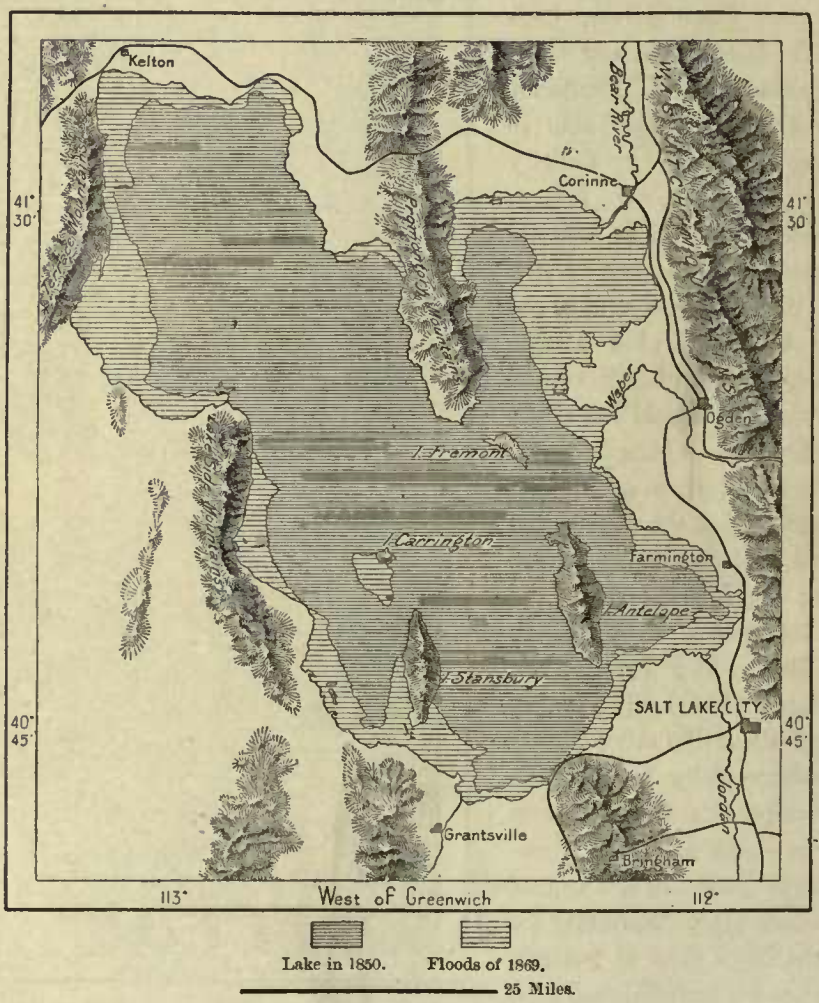


The Great Salt Lake is disposed in the direction from east to west into two

main sections by one of the numerous chains which traverse the plateau for short distances, mainly in the direction from north to south. Here the chain rises above the surface of the water in two ridges, forming in the north a rocky peninsula, in the south the long mountainous mass of Antelope or Church Island, which has a length of 15 miles, with an extreme height of 6,890 feet. The Great Lake receives a mean annual rainfall estimated at about 17 or 18 inches; but in some years this quantity is reduced by one-fifth, and then there is a corresponding

Fig. 187.—Oscillations of the Great Salt Lake.

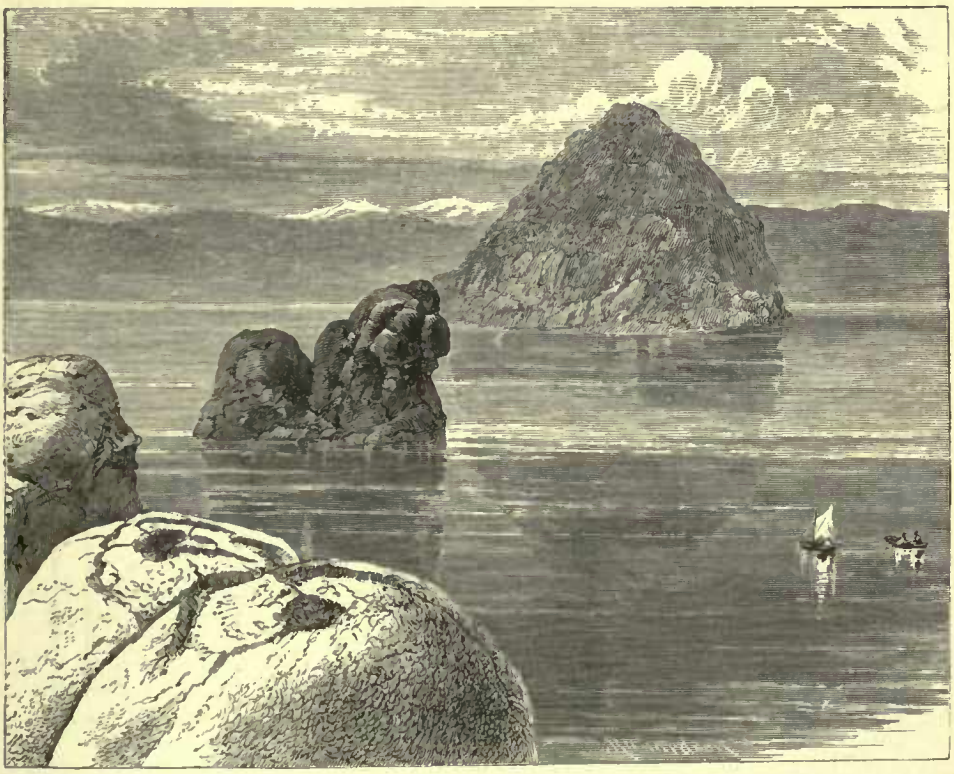
Scale 1 : 1,200,000.



subsidence in the lake level. The contributions of the three affluents, the Bear, Weber, and Jordan Rivers, being derived mainly from the melting snows of the eastern uplands, are reduced to next to nothing during the dry autumn and winter months. The attempts made to gauge approximately the total discharge of the watercourses feeding the Great Salt Lake have given a mean of about 5,900 cubic feet per second, and of this, Bear River alone would appear to supply perhaps 3,500 cubic feet. Explored for the first time by Stansbury in 1849,

the Salt Lake is now one of the best-known lacustrine reservoirs, and since the year 1875 its daily levels and shifting contour-lines have been accurately recorded. The mean altitude above sea-level is or was recently 4,218 feet. But even since the arrival of the Mormons on its shores, it has twice risen and twice subsided, the difference of level being no less than 12 feet. Such a difference naturally caused great changes in the outlines of such a shallow sheet of water, spread out on a plain enclosed by no high cliffs. Thus the superficial area has risen from 1,730 square miles at its lowest level to as much as 2,200 square miles at its greatest expansion. In the lowest depression the depth ranges from four or five to

Fig. 188.—Pyramid Lake, Nevada.



eight fathoms, according to the seasons.* But the mean depth varies as much as from two to four fathoms, so that in dry years the volume of the lake is less than half of its contents in wet years. At low water the liquid mass is much the same as that of Lake Neuchâtel, and this is about doubled during periods of heavy rains or snow. The interference of man, diverting the affluent rivers for irrigation purposes, will necessarily have the effect of reducing the extent of the Great Lake, and increasing the proportion of salt, which is already so great that in its normal state the bather finds it impossible to plunge entirely below the surface. The

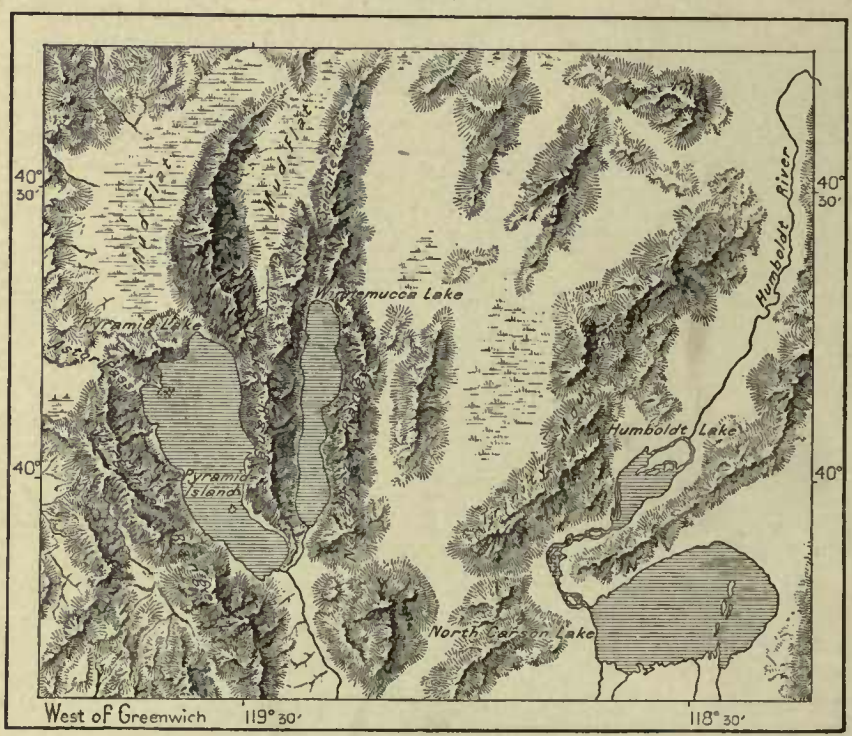
* Volume of the Great Salt Lake:—At low water, 610,000,000,000 cubic feet; at high water, 1,390,000,000,000 cubic feet.

fauna of the lake comprise only two organisms thriving in such strongly saline waters—the larva of a fly (*Ephydra*), and a crustacean (*Artemia gracilis*).

Lake Sevier, another remnant of the old inland sea, has been reduced to dimensions far inferior to those of the Great Salt Lake. It was almost completely dry in the year 1880, when the geologist Johnson was able to walk across its saline bed. The long river of like name, which falls into this depression, after describing a bend of about 300 miles round a range parallel to the Wasatch Mountains, loses half its volume in the lower part of its course, hence contributes nothing to the lake beyond a sluggish saline stream. The other torrents descend-

Fig 189.—Mud Flats and Quagmires of the Old Lake Lahontan.

Scale 1 : 1,400,000.



ing from the surrounding mountains run dry in their beds before reaching the lake, except during the freshets.

Another evaporated quaternary lake, smaller, and of more irregular form than Bonneville, has received the name of Lake Lahontan. This title, however, seems scarcely justified, for the French traveller from whom it is named gives a description of the regions traversed by him west of the Mississippi, which has no resemblance with the reality. The salt lake of which he speaks as lying 150 leagues to the west of the "de la Hontan limit," in the land of the Mozimliks, can have been none other than the Great Salt Lake of the present day, if he had any knowledge of it at all. The depression flooded by the waters of Lake Lahontan during quaternary times is the western section of the Great Basin, separated from

Lake Bonneville by various dividing ridges, but otherwise quite analogous to the eastern depression in altitude and general physical conditions. The lakes which have survived as remnants of the old Lahontan Sea, and which have no seaward outlet, are for the most part mere "mud-lakes," as they are called. Several are not even flooded, or scarcely moistened, except for a part of the year. Here salt may be said to take the place of water. These basins are also frequently called "sinks," a term implying loss or disappearance, and elsewhere applied only to the orifices of underground chasms. Thus geographers speak of the Humboldt Sink, or the Carson Sink, whose waters, when there are any, do not at all sink into the clays of their bed. After the rains, the Humboldt and Carson Sinks coalesce in a single sheet of water. In the same way Pyramid Lake, so named from a bluff in its basin, Winnemucca Lake, and Mud Lake merge during the floods in one vast body of water.

In many of the cavities formerly covered by the great lake there stretch a few pools of alkaline water, and deposits of natural soda from which the moisture has evaporated. But the most remarkable reservoirs of chemical substances are two craters of the Carson desert, not far from the little hamlet of Ragtown. These volcanic vents are known as the Soda Lakes, or Ragtown Ponds. The largest is encircled by a rim rising 80 feet above the level of the surrounding land. Within this rim the sheet of water is 160 feet lower than the edge of the rocky walls, which are very steep on the inner side. The soundings have revealed a depth of 144 feet in the centre of the basin, and there can be no doubt that this "Soda Lake" was at one time the crater of a volcano, as was also the other now dried-up basin.

West of Lake Lahontan, along the eastern flank of the Sierra Nevada, follow other lakes, which are specially interesting as indicating the natural transitional state between the old glacial lakes and the basins where saline matter has been accumulated. Lake Tahoe, a vast basin about 240 square miles in extent, flooding a cirque of the Sierra Nevada with its pure crystalline waters, also belongs to this system of closed lacustrine basins. It has an outlet in the rapid Truckee River, it is true; but this impetuous stream of sparkling waters, descending from an elevation of over 6,000 feet, falls after a course of some miles across the plateau into the closed basins of Lakes Pyramid and Winnemucca. Lake Tahoe, however, is favourably distinguished from all these dreary saline or muddy basins of the arid plateau. This lovely sheet of water, standing at an altitude of 6,200 feet, mirrors in its sparkling bosom the encircling granite heights, which tower 3,000 feet above the surface, their base clad with verdure, their crests covered with a snowy mantle. Job's Peak, one of these summits, attains an elevation of 10,270 feet, or nearly 4,450 above the lake level. Despite the quantities of sedimentary matter washed down by the torrents descending in cascades on all sides and rushing through their wooded gorges, the soundings have recorded a depth of over 250 fathoms in this charming mountain lake, and so marvellously limpid are its waters that fish may be seen at a depth of 80 or 90 feet below the surface.

Five extremely regular parallel moraines, separated by troughs flooded by a

few placid tarns, terminate on the shores of Lake Tahoe; but frontal moraines are nowhere to be seen, doubtless because the ancient glaciers were formerly continued into the lake by floating blocks of ice, which deposited in its waters the erratic boulders and drift that would otherwise have formed a terminal moraine.

Mono Lake (6,730 feet) occupies a position analogous to that of Lake Tahoe on the eastern slope of the Sierra Nevada, where it floods an ancient crater, surrounded by lofty mountains. The summits towering above its western shores,

Fig. 190.—Lake Tahoe and Lacustrine Plains of the Old Lake Lahontan.

Scale 1 : 3,500,000.

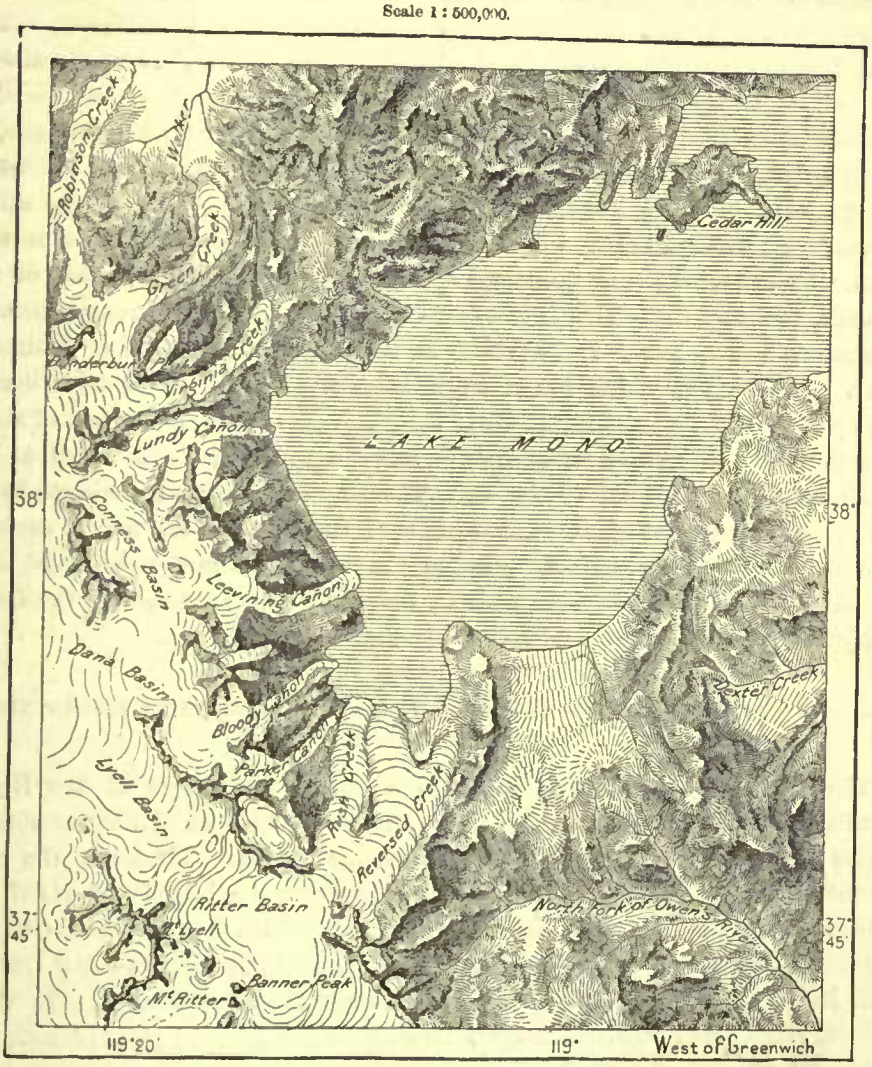
such as Mounts Dana, Lyell and Ritter, are the snowy crests on the other side of which lies the deep gorge of the Yosemite River. During the quaternary epoch, Mono Lake received numerous glaciers, several of which, grinding their way from the snowfields of the crest down the steep rocky slopes, projected their terminal moraines right into the water. This detritus has partly filled up the basin, which is only 150 feet in its deepest cavity. Mono Lake has no emissary flowing eastwards to any depression in the Great Basin; hence its waters are saline, the proportion of salt being five per cent. Neither fish nor molluscs live

in the lake, which, however, teems with the larva of a species of fly collected and stored for winter use by the surrounding Piute Indians.

A river, rising immediately to the south of the southern escarpments of the hills which skirt the shores of the lake, flows south-eastwards parallel with the axis of the Sierra Nevada, and after a course of 125 miles, loses itself in Owen's

Fig. 191.—Lake Mono and its Glaciers in the Quaternary Epoch.

Scale 1 : 500,000.



Lake, another lacustrine basin, which must have formerly resembled Mono Lake It is situated exactly at the eastern base of Mount Whitney, and was also formerly fed by glaciers from this lofty mountain. But being at present deprived of, sufficient moisture, its waters have become intensely saline, and the lake itself has shrunk to a space of about 116 square miles in its long valley, with a depth of not more than 50 to 55 feet. The depression through which its overflow formerly

escaped on the south side stands at about the same height (54 feet) above the present lake level. Of all the lacustrine basins in the United States, Owen's Lake contains the largest proportion of soda; Loew estimates the quantity deposited in its basin at no less than 220,000,000 tons. The surrounding volcanic region is frequently convulsed by violent earthquakes.

None of the closed basins within United States territory are better entitled to the name of "desert" than that named from the Mohave Indians, which is limited south-westwards by the San Bernardino Mountains and their offshoots. The channel, which is habitually spoken of as the Mohave "River," is nearly always dry, and, even after the rains, its current flows not on the surface, but under a layer of sand. The Soda Lake, where this serpentine watercourse terminates, is merely a bed of impure salt, above which the mirage often conjures up visions of blue waters encircled by woodlands and human habitations. One of the saline depressions, which has received the name of the Death Valley, occupies a sort of cañon, which at some former geological epoch formed a river-bed like that of the Colorado, probably that which is now lost in the Soda Lake. At present the only watercourse flowing to the Death Valley is the sluggish Amargoza or "Bitter" River. The valley, which has a mean breadth of about 18 or 20 miles, is developed parallel with the main axis of the Sierra Nevada for a distance of about 125 miles, and its deepest depressions fall, according to the naturalist Bell, as low as 170 feet below the level of the sea. The slopes bristle with little peaks or needles of salt, sharp as glass, while deposits of borax and of salt fill the cavities. Here and there shifting sands drive before the wind, and caravans have lost their way and perished in this desolate region. One of the crests dominating the Death Valley bears the name of the "Funeral Mount."

III.—Climate, Flora and Fauna of the Rocky Mountains and of the Pacific Slope.

The elevated lands comprised between the border ranges of the Rocky Mountains and Sierra Nevada have the extreme or continental climate characteristic of regions deprived of the moist marine breezes. Moreover, the temperature is lowered several degrees by the altitude on the inhabited parts of the plateau. Thus the isothermal line of Pike's Peak, which has a height of 14,147 feet, descends to 19·4° Fahr., that is to say, thirty-four degrees below that of Saint Louis, which lies as nearly as possible under the same parallel. In these elevated regions the winter cold often falls below the freezing-point of mercury. On the other hand, the summer heats are intense. During the summer months the nights being reduced by several hours, the absorption of heat greatly exceeds its dissipation, with the result that the mean temperature is relatively very high. By a remarkable coincidence the summer isothermals are developed from east to west of the United States, from the Atlantic seaboard to the plateau of the Great Basin, in parallel lines, as if there were no intervening mountain ranges. At Fort Laramie, standing 4,224 feet above sea-level, the weather is as warm in July as at Boston under the same latitude. So also at Santa Fé in New Mexico, 6,862

feet above the sea, the temperature in the same month is but slightly exceeded by that of New Berne, lying at a corresponding distance from the equator on the low-lying shores of North Carolina.*

The desert of the lower Colorado is the focus of heat rays for the United States. At Fort Yuma, on the verge of those wastes, the mean temperature for the whole of the summer season exceeds 90° Fahr. Here the mercury has been known to rise at times as high as 102° and even 104° Fahr., a unique phenomenon under this latitude on the North American continent. In those regions, withdrawn from the moderating influence of the ocean, the alternations of the daily climate present extremes analogous to those of the annual climate. All the conditions are here combined to cause a great variation within the twenty-four hours. The comparative absence of clouds and the grey colour of the arid ground promote the accumulation of heat in the lower atmospheric strata during the hours that the sun stands above the horizon. At night, on the contrary, radiation is stimulated by analogous causes. The lack of humidity in these "hot furnace" regions † is all the more remarkable that the winds blow usually from the sea, and are consequently charged with a considerable proportion of moisture. But during their passage over the lower Colorado plateaux and deserts, these winds, becoming still more heated, retain their aqueous vapour, which is not precipitated as rain until they strike the mountains of the interior.

As regards its climate, the narrow zone of oceanic coastlands stretching along the foot of the Cascades and Sierra Nevada presents a striking contrast to the elevated inland plateaux. Under the same latitude the annual temperature is much milder in these maritime regions than on the corresponding seaboard of the Atlantic Ocean. The eastern and western coastlands of the North American continent offer climatic differences analogous to those observed in the Old World between the shores of Asia and of West Europe. Thus, while the isothermal of 44° or 45° Fahr. strikes the coast of Maine under 45° north latitude, the fluvial plains of Oregon under the same parallel enjoy a mean temperature of 53° or 54° Fahr. Nevertheless, the discrepancy is less than in the Eastern Hemisphere, owing to the trend of the coast-line and the direction of the oceanic currents. In this respect West Europe is specially favoured, being so disposed as to receive the full benefit of the heat waves brought from the tropical regions by the atmospheric and marine currents.

In the direction from south to north, that is, from California to the Washington seaboard, the isothermal lines are deflected in such a manner as to hug the shore, so to say, for long distances. So far from coinciding with the degrees of latitude, they tend to follow the meridians, and in some places even coalesce with them. Moreover, the great central plain of California presents the singular phenomenon of *oval* isothermals, which are developed around the whole periphery from the plains of the San Joaquin to those of the Sacramento River. The climatic contrasts between California and Europe are felt especially during the summer.

* July temperatures:—Fort Laramie, 75° Fahr.; Santa Fé, 75·2° Fahr.; Boston, 72·5° Fahr.; New Berne, 79·7° Fahr.

† Such appears to be the meaning of the term "California," given in Cortes' time to this seaboard.

This season is much cooler on the shores of the Pacific than might be expected from the position of the sun. At times the apparently contradictory phenomenon has even been observed that the mean temperature of the Californian summer is exceeded by that both of the spring and autumn seasons. This anomaly is unmistakably perceptible at San Francisco, where the hottest month is September, and where July is no warmer than October. From January to July the monthly mean increase of temperature is only about six degrees, a phenomenon which is probably unparalleled in any other temperate region of the globe. Hence a number of plants, which require for their maturity a tolerably strong summer heat as well as cloudless skies, extend their range far less towards the north in California than under the corresponding isothermals of the Mississippi plain and of Europe. The vine, which yields abundant returns in the Los Angeles district, and in South and Central California, scarcely advances beyond the 38° of latitude. Maize, also, the American cereal in a pre-eminent sense, seldom ripens north of San Francisco. This remarkable tempering of the Californian summers is due to the cold waters brought during this season by a Pacific current. Between 35° and 45° north latitude, the waves which strike the coast in summer are as cold as, or even colder than, in winter. They probably form part of a polar counter-current, which in the warm season reappears on the surface, whereas at other times it flows below the tepid waters setting from Japan and the equatorial seas. But whatever be the source of the cold current, it is sufficient to lower by several degrees the mean temperature throughout the whole of the coastlands. Nevertheless, South California, or the section comprised between Conception Point and the Mexican frontier, is distinguished by quite an exceptional local climate, but slightly influenced by the cold northern currents. The projecting headland of mountains at the Point deflects to the west of the Santa Barbara Archipelago these cold oceanic waters coming from the shores of Alaska, while the mountains themselves are sufficiently elevated generally to intercept the winds blowing from the same direction. Consequently the vast semicircular maritime zone separated from Central California by the San Rafael and San Bernardino ranges forms climatically a world apart.

Another feature of the Californian climate, as compared with that of Europe, is the uniformity of the barometric pressure. Great atmospheric disturbances are rare, and the normal oscillations follow with considerable regularity. The fierce typhoons developed on the eastern shores of Asia, having exhausted their fury before traversing the Pacific Ocean, are not felt at all on the coasts of the opposite continent, as are the hurricanes which reach Europe from the east side of America. Any marked changes in the equilibrium of the atmospheric strata take place very slowly, are scarcely ever attended by electric discharges, and never occur in summer, the regular season in a pre-eminent sense. On the Pacific seaboard the normal wind sets landwards, that is to say, from the west and south-west, and to this regular marine wind is mainly due the almost uniform mildness of the climate. In summer the monsoon is, so to say, superimposed on the normal current. Being attracted by the hot arid plains of the interior, the cool oceanic

breeze sets steadily from the west or north-west towards the inland regions. But this breeze, whose mean velocity is estimated at over six miles an hour, blows only during the day. At night, when the deserts beyond the mountains have been gradually cooled, the marine current is stilled, and then replaced by a feeble aërial current setting in the opposite direction. Wherever the coast ranges present an opening the wind rushes through, thus penetrating to the plateau along the lines of least resistance. In the Columbia basin the wind passes with great fury up the gorge of the Dalles. The "Golden Gate" of San Francisco, through which the sea reaches some distance inland, gives access at the same time to a great body of air, which then spreads out like a fan in the interior of the valley. Thus the breeze, which has San Francisco as its diverging-point, sets in summer from south to north up the Sacramento Valley, and from north to south up that of the San Joaquin. Nevertheless, some of the lateral glens remain sheltered from this daily breeze, and here the normal summer temperature is maintained. Two neighbouring towns standing at the same altitude may thus present a divergence of several degrees in their summer temperature. In winter the westerly winds no longer blow regularly, and are moreover frequently interrupted by contrary currents. At times, soft winds, analogous to the *antan* of the Pyrenees, or to the *föhn* of the Alps, make themselves felt across the mountains, whose snows they rapidly melt. Such is the so-called *Chinook*, so named because it prevails in the region formerly visited by the "Chinook" traders in British Columbia, Washington and Oregon. In South California a similar wind, which brings a stifling heat and burns up the vegetation, is known by the name of "Santa Ana." Under the influence of all these warm moist currents the sky becomes overcast, and the atmosphere charged with fogs, though, generally speaking, the air of California is remarkable for its great purity. The Lick Observatory, established on the summit of Mount Hamilton, in the Coast Range, at an altitude of 4,440 feet, is one of those where continuous observations may be carried on with the least risk of interruption from foul weather. Thus excellent observations of Mars were made during the period of opposition in August, 1892, when the "canals" or double lines recorded by Schiaparelli in 1877 were studied by three independent observers.

Taken as a whole, the mountainous region of the Far West is one of the driest zones on the face of the globe. Certain parts of Utah, of Arizona, and New Mexico receive no supplies of water, except from the torrents descending from the snow-clad crests, and here all tillage would be impossible without artificial irrigation. Where the canals or *acequias* stop, there begins the desert *chaparral*. The great age of houses built of simple adobe or sun-dried brick, which in a rainy country would soon be converted to a heap of mud, is a convincing proof of the extreme dryness of the atmosphere in New Mexico. If the testimony of the few farmers settled in the country can be accepted, this dryness would appear to have even increased since the arrival of the whites. The statement is rendered highly probable from the ruins of formerly populous cities, situated in regions which at present are quite arid.

On the Pacific seaboard, the rainfall increases in the direction from south to north. While the South Californian valleys receive a scant supply, the mean annual discharge exceeds twenty inches at San Francisco, and amounts to upwards of forty inches at the mouth of the Columbia. "It is always raining in the North," say the less fortunate South Californians, who jocularly assert that the Oregonians have "webbed feet." But immediately to the east, the rainfall is far less copious. The annual precipitation, however, differs greatly, and in some years San Francisco receives a supply three times in excess of the quantity discharged during certain dry years. The moisture precipitated in the form of snow on the plateaux and the crests of the mountain ranges varies in the same proportions.*

Flora and Fauna.

The climatic conditions of a country are necessarily reflected in its vegetation. Where the rainfall is slight the flora is scanty, and forest growths are absent altogether. Where the rains are plentiful forests cover the land, and their density is in direct ratio to the frequency and abundance of the downpours. In the vast space of about 1,150,000 square miles, which stretches from the upper Missouri to the plateaux of Texas, and from the low-lying plains of the Colorado to the crests of the Sierra Nevada, the prevailing species are the characteristic plants of the cactus and artemisia families, which impart its general physiognomy to the scenery of these saline and gypsous regions. The limits of the zone of "wild sage" (*Artemisia tridentata*) roughly coincide with those of the plateaux. Since the invasion of the Laramie slopes by the Pacific Railway the vegetation has undergone a marked change. Instead of grasses the ground yields scarcely anything except this sage-bush and other odoriferous plants. They grow everywhere in dense patches, in the bottom-lands, on the slopes and summits of the hills, and the higher they ascend on the plateau the more they increase in size. The air is heavy with the odour of camphor and oil of turpentine peculiar to these aromatic growths. To them perhaps, as well as to the general salubrity of the climate, should be attributed the numerous cases of recovery in the case of consumptive patients sent by their physicians to the regions of the Far West.

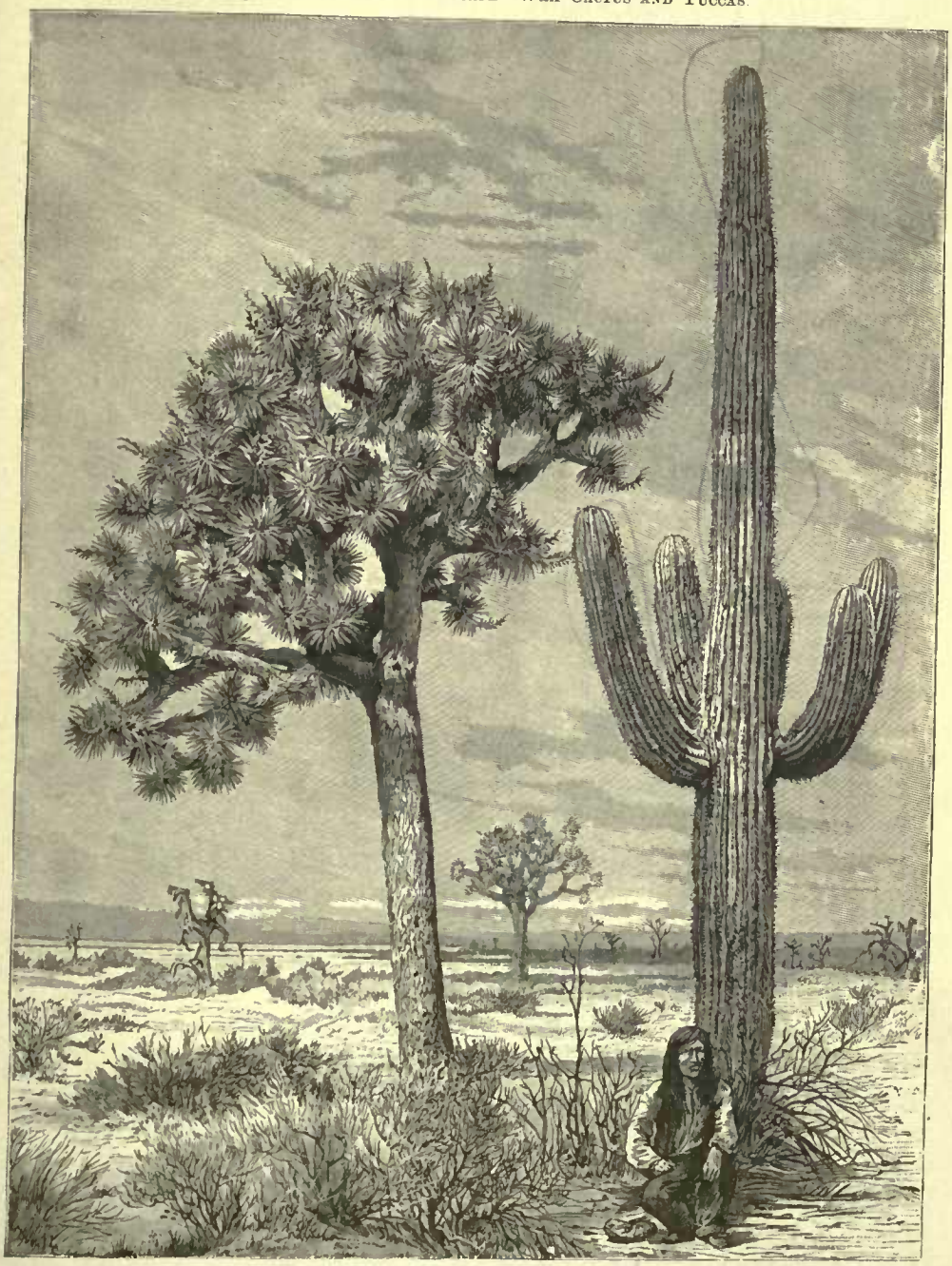
The moist river bottoms are fringed with a few trees of the poplar family, aspens with slender trembling foliage. In the cañons of Nevada stunted junipers and firs still linger in the more sheltered spots. But they were formerly far more numerous, their cones yielding to the Indians a much-valued food, while the timber was utilised by the early miners as fuel and in preparing the gear required for their mining operations. Plants of low growth are replaced in the southern

* Average rainfall in the western regions of the United States according to Schott and other observers:—

Rocky Mountains.	inches.	Pacific Seaboard.	inches.
Virginia City	17	Port Townsend	40·50
Pioche	6·50	Olympia	56
Fort Laramie	14·70	Astoria	79
Fort Bridger	8·50	San Francisco	22
Pike's Peak	32	San Diego	9·50

regions by the creosote bush (*Larrea mexicana*), and by prickly shrubs, such as the mezquite and sharp-leafed yuccas, imparting to the landscape an aggressive aspect.

Fig. 192.—Arizona Landscape—Wax Cactus and Yuccas.



The *pitahaya*, or giant cactus (*Cactus giganteus*), is the characteristic plant of the Arizona and New Mexican wastes even more than it is of the Mexican plateau. Colossal wax cactuses, from 35 to 50 feet high, stand out as solitary sentinels on

the plain, retaining from base to summit a nearly uniform thickness. The branches, never more than two or three, spring from the stem at right angles, and then shoot up vertically, armed like the stem itself with star-like spikes.

In the more arid regions, such as the Mohave desert deprived of all moisture by the barrier of the San Bernardino range, even the cactus type of plants disappears. Here nothing is to be seen except the argillaceous clays and saline flats dotted over the vast plains bordered in the distance by reddish mountain ranges. But above the arid depressions and denuded plateaux here and there are seen lofty summits penetrating into the upper zone of moisture-bearing clouds, their sparsely timbered or even richly wooded slopes presenting a most agreeable contrast to the surrounding cliffs. Certain wooded tables, with their bare yellowish and ravined escarpments, look at a distance like gardens suspended in mid-air.

Above the altitude of 4,300 feet the creosote-yielding larrea is no longer seen, and here the traveller enters the zone of junipers, which on the flank of the mountains reach no higher than about 6,600 feet. Beyond them follows the zone of pines, and then at varying elevations all arborescent vegetation is killed by the cold. In Colorado, mountains exceeding 11,000 feet have no longer any trees on their crests, and the highest forest growths are mere scrub transformed beneath the weight of the snow to a sort of rough flooring over which the climber has to scramble as best he can to reach the summit. In the Californian Sierra Nevada the upper limit of the forest zone begins at 10,000 feet.

There are few regions where the decided influence of moisture-bearing currents on the vegetation can be more easily recognised than in California. Here the winds from the Pacific, driving the rain clouds before them, strike first against the western slopes of the Coast Range. Then surmounting the crests of this low outer rampart, they impinge on the escarpments of the far more elevated Sierra Nevada at a mean altitude of about 4,000 feet. Below this line the vegetation is scanty, the foliage lustreless, while the general aspect of the landscape, often seen through a veil of dusty fog, varies from a grey to a violet or reddish tint.

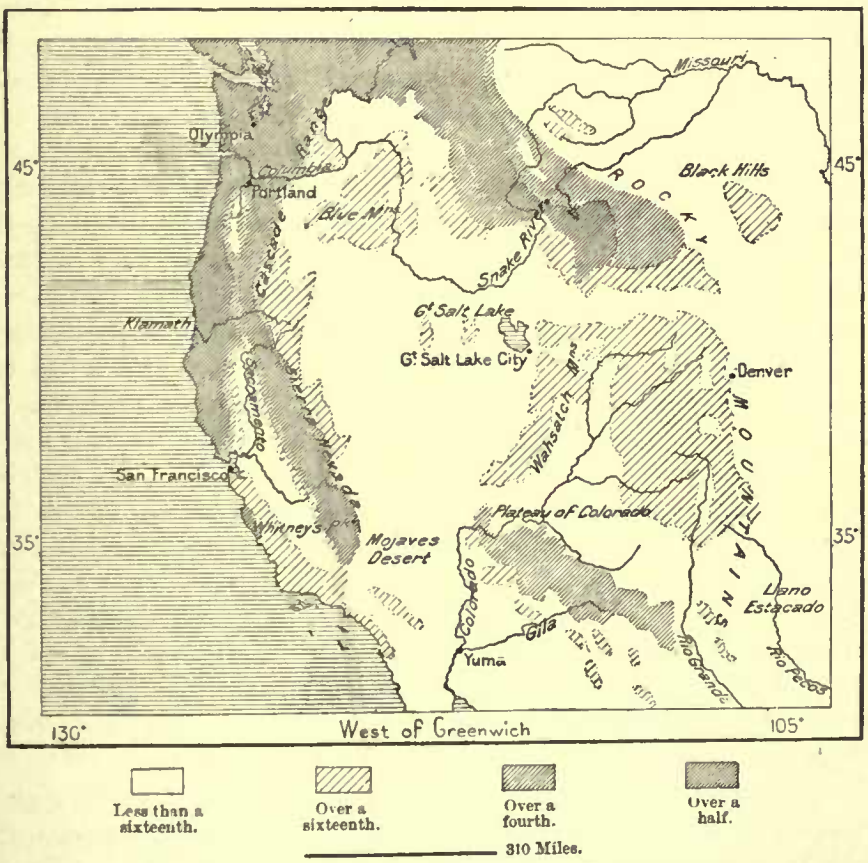
But where the beneficent influence of the regular moist winds begins to be felt, there also prevails a grand and vigorous growth of conifers. Forests of this order of plants cover the upper valleys and the slopes of the Sierra Nevada as far as the base of the snow-clad pyramids; their range extends northwards along the coastlands into British Columbia and Alaska, and ramifies eastwards along the United States frontier through Idaho, Montana, and Wyoming. In this superb forest zone the species, although less varied and less numerous than those of the corresponding zone on the Atlantic seaboard, are still reckoned by the dozen. Twelve distinct varieties of conifers prevail, not intermingled promiscuously, but following regularly along the uplands in so many series of family groups. On an average the domain of each such family group comprises on the flanks of the mountains a vertical height of about 2,600 feet, but for none of the groups are these lines coincident. Most of them are disposed obliquely, lower in the northern regions where moisture abounds from the very roots of the mountains; then the several zones ascend gradually in the direction of the south towards the snowy

uplands in search of the atmosphere, the degree of humidity and temperature that best suit their constitution. Another noteworthy contrast is presented by the various timbered zones of California, where the forests are much more dense and continuous in the north, whereas towards the south they more readily break into smaller groups and thickets in which each member of the family acquires a more marked individuality and assumes a more picturesque beauty.

In the northern forests the dominant species is the Douglas spruce or "yellow pine" of Canada (*abies Douglassii*), distinguished by its ruddy brown bark. Certain

Fig. 193.—Forests of the West.

Scale 1 : 20 000,000.



forests that have now fallen to the woodman's axe consisted exclusively of this species. Till recently it was by no means rare to meet in the pine groves of Washington and Oregon specimens of the yellow pine 260 and even 360 feet high. Still taller are the conifers of the sequoia genus, of which there survive only two species, the evergreen redwood (*Sequoia sempervirens*) and the "big tree," or mammoth tree (*Sequoia gigantea*, formerly *Wellingtonia gigantea*). According to Oswald Heer, the sequoia is a "witness of past ages." Common enough in the extinct tertiary flora of the whole earth, its range is extremely limited in the present epoch. Nevertheless it presents no symptoms of decrepitude; it is

still in the plenitude of all its vigour and majesty. The redwood is confined entirely to the Coast Range from the mountains of Santa Ana to the Klamath valley. Near Russian River, where it forms whole forests to the exclusion of all other species, Whitney measured a stem 276 feet long. The range of the Sequoia gigantea is even still more restricted, being found only on the western slopes of the Sierra Nevada between the 36° and 38° 30′ north latitude, and here only in nine separate groves. The largest of these groves shades the slopes of the valleys draining to King's River, north-west of Whitney; but visitors are attracted chiefly to the giants of Calaveras and Mariposa, which lie nearer to San Francisco and the Yosemite Valley. The largest sequoia measured by Whitney is 325 feet high with a girth of 90 feet. Formerly there were others which exceeded 400 and even 425 feet; but some speculators had them felled to exhibit the bark at fairs, or to sell the wood, though this has scarcely any value. Despite the law which protects these giants of the forest by declaring them the common property of the nation, the work of destruction continues.

In the Rocky Mountains the fossil remains of an extinct fauna are found in enormous multitudes. The alluvial deposits of the cretaceous sea, which formerly flooded a great part of the upland plains, are extremely rich in fossil saurians of all kinds, amongst others pterosaurians, or "flying lizards," of far larger dimensions than the pterodactyls of the Old World. From these they also differed in the complete absence of teeth, thus approaching nearer to the modern bird type.

Amongst the crawling saurians the *titanosaurus* of Colorado was no less than 60 feet long, and rose to a vertical height of 30 feet to reach the foliage of the large trees which formed its chief food; on the other hand the diminutive *nanosaurus* was no bigger than an ordinary cat. These various animals of the reptile order are often called by the general name of "sea serpents;" but the first American snakes, all of pelagic origin, made their appearance about the eocene epoch. The dinosaurians, or land reptiles, that is to say, the "frightful lizards," are characterised by an extremely small brainpan, smaller than that of any other known animal form. Comparing the brain of a dinosaurian with that of an ordinary crocodile, Marsh has shown that it was proportionately a hundred times smaller.

No traces of an avifauna occur before the cretaceous ages. But the mammals come in with the triassic epoch, when they are represented by a marsupial, an inferior type of this order. Unfortunately geologists have hitherto failed to discover any remains of mammals in the jurassic and cretaceous formations. On the other hand later strata have yielded them in the greatest variety of types. It was in the lower eocene that was found the *eohippus*, the oldest representative of the horse, though no bigger than a fox. About thirty other species of the horse family belong to the New World, which geologists are now disposed to regard as the original home of the equidæ. According to Marsh the tapirs and rhinoceroses would also appear to be animals of American origin, as well as the camel and deer, and perhaps also the bovidæ and the proboscidæ. Elephants, mastodons, and the megalonix roamed the forests and savannas of North America. The

Indians, who often came across skeletons of these huge beasts in the muds and gravels of the modern drift period and in other detritus, had given them the name of "fathers of the bison," as if they also had, after a fashion, recognised the doctrine of the evolution of species. Amongst the mammals which date from the beginning of the tertiary epoch, the *phenacodus*, an animal about the size of a wolf, has attracted the special attention of paleontologists. According to Cope it offers essentially primitive and undifferentiated forms, so that it might be recognised as the common ancestor of the hoofed animals, of the monkey and of man. The imprint of footsteps of a species of edentate discovered near Carson, in Nevada, had also led to a belief in the discovery of a special human type, the so-called *homo nevadensis*.

The highland regions of the United States facing towards the Pacific Ocean are still inhabited by large animals; but none of these belong to absolutely indigenous forms. They are quadrupeds of the Canadian fauna, such as the elk and the grizzly bear, which are met on the elevated plateaux in association with representatives of the fauna of the Mexican plateaux. The beaver, one of the characteristic animals of the well-watered and wooded northern regions, was everywhere till recently met along the banks of all the watercourses in the Rocky Mountains and Sierra Nevada, and even as far south as the valleys of the Pecos, Rio Grande del Norte and Gila Rivers. It has constructed dams in the streams as far as the neighbourhood of El Paso on the Mexican frontier. In the Bad Lands these rodents are still common enough; whenever sportsmen give them a short respite, they begin at once to swarm along the banks of the torrents. Other species have disappeared without any apparent cause. Thus the hares of the Great Basin, which were so numerous in 1870 that they were killed to feed the swine, had become so rare in 1871 that the naturalist Allen had to hunt them up far and wide before he could procure a single specimen. But the great plateaux of the Rocky Mountains still remain, as in cretaceous times, the special home of reptiles. Here are found lizards of all sizes and colours, some of which are of formidable aspect though quite harmless. The only species that is really venomous is the *Heloderma suspectum*, which has received from the Anglo-Americans the name of "monster of the Gila;" but even this creature is of peaceful habits and slow to bite. On the plateaux are also some large tortoises, "horned frogs" (*Phrynosoma cornutum*), which resemble chameleons, huge warty lizards bristling with spikes, centipedes, tarantulas, and other creeping things that glide about in the holes and crevices of the clay or rocky ground.

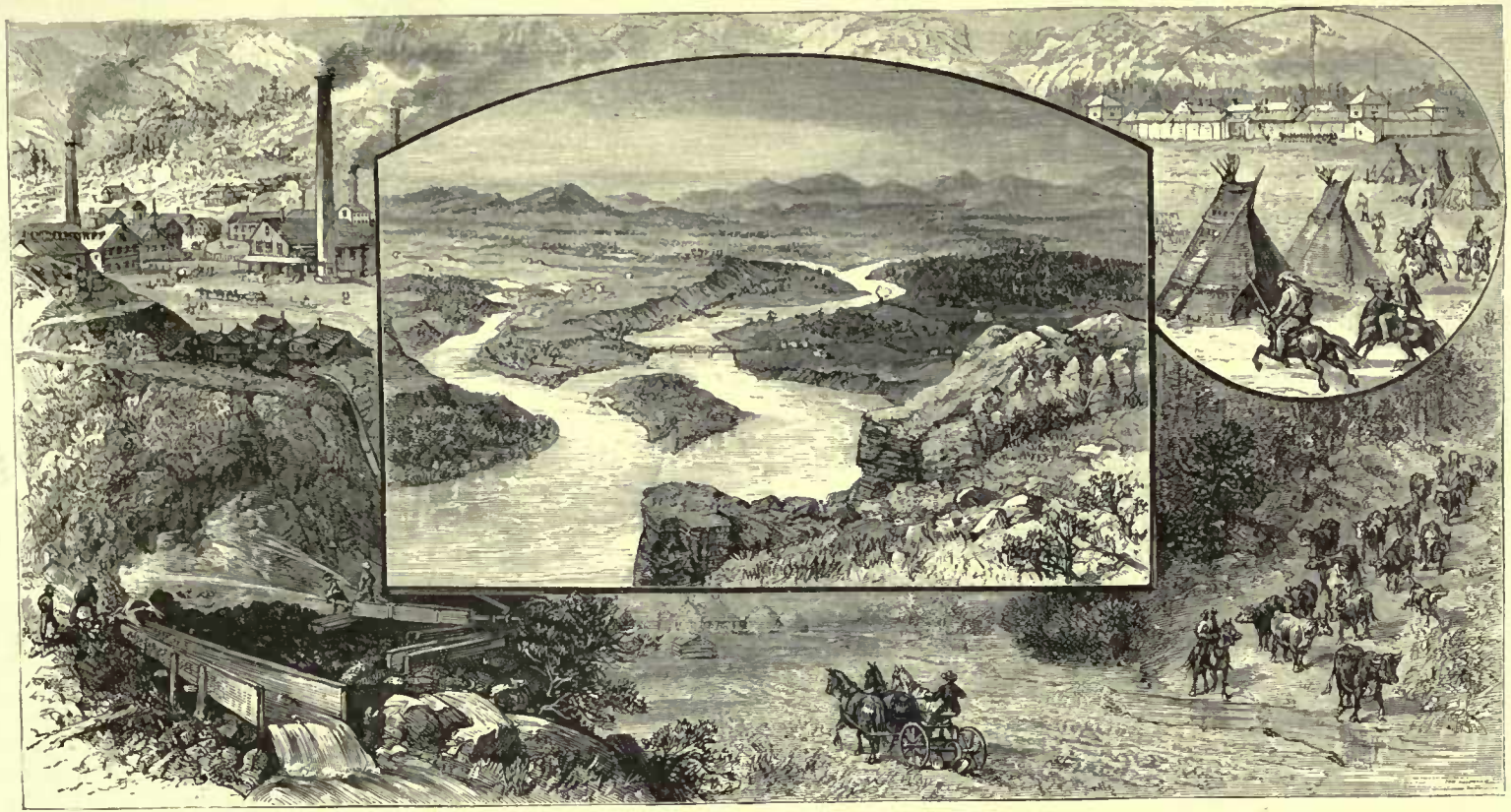
CHAPTER VIII.

STATES AND CITIES OF THE ROCKY MOUNTAINS AND OF THE PACIFIC SLOPE.

1.—Montana.

THE term Montana, in the sense of "Mountainous Land," is applied to the state which comprises within its limits the lofty dividing ridges between the sources of the Missouri and several headwaters of the Columbia. Like most of the other states, it is bounded by straight lines with no regard for the natural features of the country, except towards the west and south-west. Even the small section of the marvellous Yellowstone National Park included within its frontiers is marked off by similar conventional lines. The Dominion of Canada, the Dakotas and Wyoming form the conterminous political regions on the north, east, and south, the lines of demarcation here being various degrees of latitude and longitude. But the crests of mountain ranges serve in great measure as the common frontier between Montana and Idaho on the west and south-west sides. In superficial extent Montana ranks amongst the very largest territorial divisions of the Union, being about 26,000 square miles larger than the whole of the British Isles. But by far the greater part of this vast area is too mountainous and too cold to be suitable for tillage. Hence stock-breeding constitutes the chief agricultural resource of the country; the wool yielded by its numerous flocks is highly prized in the markets of the Atlantic seaboard. Both cattle and sheep thrive on the nutritious buffalo and bunch grasses of the sheltered valleys, where they range throughout the year, needing little artificial protection in ordinary winter seasons. Some of the bench-lands and river-bottoms are even suitable for regular farming, and good crops of wheat, barley, oats, roots and potatoes are grown in these more favoured districts. But far more important are the mineral resources of the country, which abounds especially in copper, gold, and silver. In this respect, Montana occupies a foremost position amongst the mining states of the Union, and its gold-washings, gold, silver and copper mines have, with the development of its railways, contributed most to the settlement of the land.

Of all the states of the Union, Montana comprises (1892) the most extensive enclaves of lands reserved for the aboriginal populations. In the north-west dwell the Flatheads; in the north along the Canadian frontier extend the reserva-



VIEWS IN MONTANA.

tions of the Gros Ventres, Piegans, Crows and Blood Indians; lastly in the south, between the course of the Yellowstone and the Wyoming frontier, the Crows possess another enclave watered by the Big Horn River. It was here that the detachment of 437 men commanded by General Custer was annihilated in 1876. The Cheyennes, the Modocs, and the Assiniboines have also little separate territories in the same region. But the white settlers are yearly growing more impatient at the presence of these natives, many of whom seem to be really incapable of adapting themselves to the requirements of a higher culture. Hence closer contact must almost inevitably result in further encroachments and the confiscation of all the Indian lands in the near future.

Meanwhile, however, there is plenty of room for the white inhabitants, who before the year 1891 had brought only about 26,000 acres under cultivation. At the census of 1890 the density of the population fell short of one person to the square mile. Even after its annexation this region long continued to be frequented only by the Canadian voyageurs, trappers, and peltry dealers. At that time the warlike tribes of prairie Indians, more especially the Crows, Dakotas, and Blackfeet, occupied the eastern slopes and plateaux, while the more peaceful Flatheads (Selish) and Bannacks were confined to the western uplands. Although Montana was organised as a territory under its present name in the year 1864, it continued at first to attract so few settlers that the total population scarcely exceeded 20,000 in 1870. At the next census of 1880 it still fell short of 40,000; but it was nevertheless admitted into the Union in 1889, before it was officially known to contain the required number of inhabitants. The census of 1890, however, showed a population greatly in excess of that number.

A few villages, trading stations, and military posts follow at great intervals along the banks of the Yellowstone and Missouri Rivers; a few mining towns, connected by branches with the transcontinental lines of railway, nestle in the sheltered nooks of the river gorges. *Helena*, the capital, lies in the heart of the mountains at an altitude of 4,000 feet on the Prickly Pear Creek, which descends to the left bank of the Missouri below the "Hell Gate Passes." At the neighbouring station of *Prickly Pear* the first discoveries of auriferous sands were made in 1859, and rich gold-mines were discovered in the same district in 1864, after which Helena began to attract numerous settlers. About 18 miles west of Helena the Northern Pacific Railway pierces the chief range of the Rocky Mountains by a tunnel under the Mullen Pass. *Butte City*, about 65 miles south by west of the capital, owes its name to the granite "buttes" by which it is surrounded, and from which it extracts gold, silver, and copper ores to the annual value of over $20,000,000. Including the neighbouring camps of the miners it had a population of over 35,000 in 1890, and was the most important mining centre in the north-west between Minneapolis and Portland. But the largest gold-mine in the state is found about 20 miles north of Helena at *Drum Lummon*, a place of quite recent foundation. On the other hand *Virginia City*, formerly a flourishing mining centre, has now been nearly abandoned. It stands near the Continental Divide about 110 miles due south of Helena at an altitude of over

5,700 feet. Here is the celebrated Alder Gulch, which is about 16 miles long, and which receives several gold-yielding tributaries. Silver and argentiferous lead ores also occur in the district.

2.—Idaho.

Idaho, which follows west from Montana, lies almost entirely within the Columbia basin, being drained in the north by Clarke's Fork and its affluents, and in the south by the Snake River, which here receives no tributary of any size. The extreme south-eastern corner lies in the Great Basin, being drained by Bear River to Great Salt Lake in Utah. The state has somewhat eccentric outlines, the eastern frontier tapering rapidly in the direction of the north-west, where a narrow strip of its territory projects between Montana and Washington northwards to the Canadian boundary. In the north-east it is separated from Montana by the Bitter Root Mountains, which here form the dividing ridge between the Missouri and Columbian catchment basins. In the south-east the meridian 111° 3′ west longitude constitutes the common frontier with Wyoming, while southwards the 42° of latitude separates it from Utah and Nevada. Lastly, its long western frontier towards Oregon and Washington is formed partly by the 117° longitude, and partly by a section of the Snake River, which here nearly coincides with the same meridian. Like Montana, Idaho possesses a small slice of the Yellowstone National Park, though most of this "Wonderland" lies within the limits of Wyoming. The northern districts of Idaho, which are extremely mountainous, possess little to attract immigrants except their forests, pasturages, and mineral deposits. But the depressions of the vast southern plains have some highly productive lands; and a great part of the elevated sage plains might be brought under cultivation by artificial irrigation. But Idaho is on the whole far more suited for stock-breeding than for tillage. Vast spaces on the prairies and lower slopes are covered with the "white sage" (*Eurotia lanata*), familiarly known by the name of "winter fat," because cattle thrive and fatten on it even in the cold season.

But like its eastern neighbour, Idaho has been occupied by settlers of white race mainly for the sake of its gold-washings. Some of the more productive districts had become so many little Californias, thanks to the arrival of miners who either camped out or burrowed in the ground, constituting a new society in which modern civilisation was strangely blended with a return to barbarism. But the mines were gradually bought up by capitalists, and the adventurers disappeared, giving place to permanent settlers, while their camping-grounds were transformed to regular towns. Recently a few Mormon communities have established themselves in the southern districts. The Chinese also form a relatively numerous element of the population, whereas the former masters of the land—Blackfeet, Nez Percés, Cœurs d'Alène, Kootenay, and other Indian tribes—have been confined to narrow reservations scattered over the state. In 1863 Idaho was constituted a separate territory, which at first included the whole of Montana and a portion of Wyoming. Next year a great part of this region was detached, and in 1868 Montana was finally reduced to its present

limits. Although gold had already been found in 1852, and rich deposits discovered at Oro Fino in 1860, the population increased so slowly that it numbered only a little over 20,000 at the census of 1870. Progress was again retarded by the devastating Indian War of 1878, so that at the census of 1880 the population had advanced only to 32,600. Even when Idaho was admitted as a state into the Union in 1889, its population was but 84,385.

Apart from the officials and others required for the service of the stations on the various railway lines, the white populations are almost exclusively concentrated in the south-western districts of the state. Here *Idaho City* was founded by the miners in 1865 on the Moore's Creek affluent of the Snake River; in its early days it had a fluctuating population ranging from 5,000 to 10,000. At present it is quite a small place, the rich gold placer-mines on which its prosperity depended having been mostly exhausted. About 50 miles south-west of Idaho City lies *Boisé City*, which has been the capital since 1864, and which still remains the largest place in the state. It stands close to the old post of *Fort Boisé*, so named from the Boisé or Big Wood River, on which it stands, and which flows westwards to the Snake on the Idaho frontier. East of Boisé City are a few little temporary or permanent centres of population, such as *Warren*, *Richmond*, *Washington*, and *Silver City*, all in the valley of the Little Salmon, which flows northwards to its confluence with the Salmon tributary of the Snake River near the Oregon frontier. Silver City is so named from its numerous quartz silver mines, of which as many as twelve have been worked at the neighbouring mining camp of *Fairview*. It is distant 80 miles south-west of Boisé City.

3.—Wyoming.

The new state of Wyoming takes its name from one of its mountains, which is itself named from the lovely Pennsylvanian valley of Wyoming, the Anglicised form of the Indian Maughwaume, or "Broad Plain." It is everywhere marked off by geometrical lines which form a rectangle somewhat longer east and west than north and south, and which is conterminous with Montana in the north, South Dakota and Nebraska in the east, Colorado and Idaho in the south and west. At its north-west corner it encloses a large portion of the Yellowstone National Park, while its south-western angle forms a wedge penetrating some distance into the north-eastern section of Utah. Most of the surface is essentially mountainous and even Alpine, being traversed in an oblique direction from north-west to south-east by some of the main ranges of the Rocky Mountains system. Here is the Continental Divide between the three basins of the Columbia, Colorado and Missouri-Mississippi, some of whose head-waters have their sources in close proximity within the limits of the state. Hence Wyoming is far too rugged and elevated ever to become the centre of a large agricultural population. But numerous cirques of great extent, formerly lacustrine basins, now under grass, present magnificent alpine pasturage for cattle and sheep.

The most low-lying part of the state, and also the most valuable from the economic standpoint, lies in the south-eastern corner, which is watered by the

North Fork of the Platte or Nebraska River. On these plains, which lie beyond the western plateau at the east foot of the Rockies, the capital of the state has been founded, and here also was constructed the first railway intended to cross the upland region of tablelands and mountains between the Mississippi plains and the Pacific seaboard.

Wyoming was first organised as a territory in 1868, when it was constituted within its present limits by various sections detached from Dakota, Idaho, and Utah. In 1870 the white population was still under 10,000, and although it had advanced to little more than 20,000 in 1880, it was admitted to the Union as a state with a number of other territories in 1889, while the number of inhabitants still fell short of 60,000. It is even more amply represented than some of these, for the franchise has been extended to women. All the aborigines have disappeared except about 1,600 Shoshone (Snake) Indians, who are confined to a reservation of 3,660 acres on both sides of the Wind River towards the centre of the state.

Cheyenne, the capital, occupies an important position near the Colorado frontier at the junction of two trunk lines of railway; it stands on the eastern slope of the Black Mountains about 6,000 feet above sea-level and 106 miles north of Denver. Formerly a mere collection of tents and log-huts peopled by navvies and others connected with the railway works then in progress, Cheyenne has long grown out of its chrysalis state and is now a handsome city, regularly laid out, with railways radiating in all directions. Some 50 miles farther west beyond Evans Pass the Central Pacific Railway passes *Laramie City*, a busy centre of metallurgic and railway machine factories. The term Laramie, of such frequent occurrence in this region, being applied to plains, mountains, a peak, a river and a neighbouring fort, perpetuates in a slightly modified form the name of the Franco-Canadian voyageur and pioneer explorer, Laramée. At *Fort Laramie*, near the mouth of the Laramie River, there is a Government reservation 50 square miles in extent.

Evanston, on Bear River, 75 miles north-east of Salt Lake City, is the seat of the coal-mining interest. Here iron ores occur in association with the coal-beds, which, near Evanston, range in thickness from 20 to over 30 feet. Other growing centres of population are *Green River City*, a station on the Union Pacific Railroad 272 miles west of Laramie; *Rawlins* on the same railway 136 miles from Laramie, with a sulphur spring possessing curative properties, and *Sherman*, also on the Union Pacific 37 miles west of Cheyenne, in the heart of the Laramie range, 8,257 feet above sea-level.

4.—Colorado.

The state of Colorado is, like Wyoming, a slightly elongated rectangle carved out geometrically across plains and mountains with little regard to the physical conditions. Besides Wyoming and Nebraska in the north-east it has for conterminous states—Kansas on the east, New Mexico and Utah on the south and west, and in the extreme south-east corner the western extension of Oklahoma territory. But despite these purely conventional boundaries, Colorado really comprises two

well-marked physical regions, presenting the sharpest contrasts in their relief, general aspect, climate and products. In the west, occupying more than half of the whole territory, is the upland region of the Rocky Mountains, with their snowy peaks, elevated mountain valleys or "parks," deep river gorges and tablelands. In the east stretch the slightly inclined prairies, sloping gradually in the direction of the Mississippi, and watered by sluggish shallow streams. In the western highlands are stored the inexhaustible treasures of gold, silver, lead, iron, coal and petroleum, which have hitherto been the chief attraction for settlers. In the eastern plains are its fertile and well-watered bottom and bench lands, its rich pasturage, pure atmosphere and salubrious climate, towards which immigrants must continue to gravitate, according as its multitudinous resources are developed. Colorado also enjoys the advantage of commanding the most frequented passes over the Rocky Mountains. Down to the middle of the present century its only white inhabitants were a few Mexican herdsmen settled in the San Luis Valley, in the upper Rio Grande basin. But the French names of numerous rivers and mountains perpetuate the memory of the Canadian traders who formerly traversed the Far West in all directions.

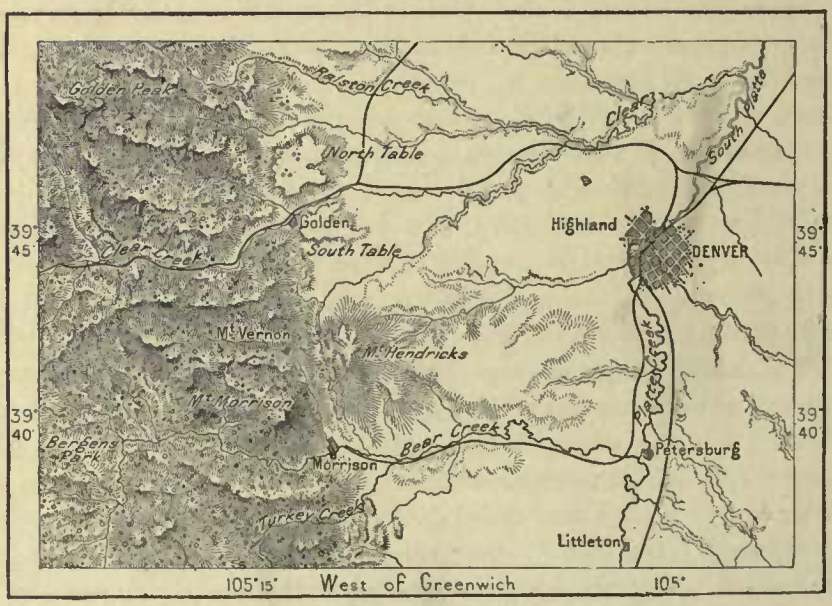
Before the Mexican War about two-thirds of Colorado, including the whole of the West and much of the South, were still regarded as belonging to Mexico; but by the treaty of Guadalupe all this region was permanently ceded to the United States. It first began to attract Anglo-American settlers after the discovery of rich goldfields north of Pike's Peak in 1858 and 1859; at the first census of 1860 the inhabitants already numbered over 34,000, including, however, nearly 10,000 Indians chiefly of Ute stock. In 1861, that is, in the very year that the Civil War broke out, it was organised as a territory with its present limits, and after several applications was admitted to the Union as a state in 1876, though the population at the census of 1870 scarcely exceeded 47,000. Since then the increase both of inhabitants and material wealth has been extremely rapid, the population having more than doubled during the decade between 1880 and 1890. During the same period over 620,000 acres of prairie were brought under cultivation by artificial irrigation, while the development of the mining industries was such as to place Colorado in the forefront, at least for the production of silver and lead. It is noteworthy that in this region most of the surprisingly rich silver ores also contain gold, the gold ores being similarly associated with silver and copper, while the lead ores are also argentiferous.

Denver, capital and largest city of Colorado, is already one of the great cities of the Far West; its flourishing aspect is all the more surprising to visitors that it is separated by vast solitudes from the well-peopled plains of Kansas and Missouri. It rises on the western horizon like an affluent city of the Atlantic seaboard suddenly transplanted to the heart of the wilderness. For the beauty of its surrounding panoramic views Denver is almost without a rival amongst the cities of the United States. Standing 5,300 feet above sea-level at the confluence of Cheery Creek with the main branch of the South Platte, it commands towards the east the vast expanse of rolling plains merging in the distance with the rotun-

dity of the globe, while in the west it is itself dominated to a height of over 8,200 feet by the escarpments of the great Colorado range, clothed in verdure from its base to its snow-capped crests, and stretching away beyond the northern and southern horizons. Thanks to a tangled network of converging lines of railway, Denver, which is distant 640 miles west of Kansas City, and 106 miles south of Cheyenne, has become the chief emporium and distributing depôt on the main highway between the middle Mississippi and the Pacific Ocean. Owing to its salubrious climate it has become a popular health resort for invalids. The surrounding heights are dotted over with suburban villas, many of which belong to traders and manufacturers of the Atlantic States, and the population has risen from less than 5,000 in 1870 to over 35,000 in 1880 and nearly 107,000 in 1890. The mountain gorges, through which several railways penetrate from

Fig. 194.—DENVER.

Scale 1 : 375,000.



Denver to the western plateaux, are occupied by a number of mining villages, such as *Golden City*, *Golden Gate*, *Mountain City*, *Central City*, and *Empire City*, whose rich auriferous ores are sent to the branch mint of the United States in Denver.

But the most populous mining centre of Colorado is the flourishing city of *Leadville*, which, two years after its foundation in 1878, had already a population of nearly 15,000. It lies at a mean altitude of about 10,200 feet in the upper valley of the Arkansas, on the western slope of the mountains, dominated by Mount Lincoln. Leadville differs as regards its early history from most of the mining towns of California. In this state, which was suddenly invaded by adventurers from every quarter, the new arrivals scarcely ever thought of laying out their towns on any regular plan; sheds, shanties, and scaffoldings were run up at haphazard, according to the necessities of the miners, and these structures

either served as the beginning of future towns or else fell to ruins, according to the results of the mining operations. But when the extensive deposits of the upper Arkansas were discovered, large monopolies had already been developed, and financial companies at once bought up all the available lands. Thus it happened that Leadville was constructed on the usual plan of American cities, with regular blocks, straight thoroughfares and avenues, squares, and public gardens. This great centre of the mining industries has also become a favourite summer resort, and various bathing establishments and other attractions have sprung up in the neighbouring valleys and on the surrounding mountains.

Fig. 195.—Leadville and the Sources of the Arkansas.
Scale 1 : 370,000.

At the foot of the "Grand Cañon" of the Arkansas stands the city of *Pueblo*, a centre of the coal, oil, and metallurgic interest, which has been called "the Pittsburg of the West." It is connected with Denver by railways that skirt the foot of the main range and pass by *Colorado Springs*, a much-frequented pleasure resort known as the "City of Millionaires." *Trinidad*, near the New Mexico frontier, lies in the vicinity of the extensive coal beds of the Raton Hills.

5.—Utah.

Utah, which takes its name from an Indian tribe of the Snake family, is one of the most isolated regions of the United States. With the neighbouring Nevada

it is enclosed by ranges and divides, which prevent its surface waters from being discharged seawards; hence the expression "Great Basin" in the sense of the "Closed Basin" often applied to the whole of this elevated plateau. The streams, however, flowing through the rocky gorges in the southern and south-eastern districts of Utah find their way to the Colorado. Those of the centre and north belong to the closed depressions of Lake Sevier and the Great Salt Lake, survivals of the "Lake Bonneville," which, in a former geological epoch, sent its overflow to the Columbia. Lines coinciding with degrees of latitude and longitude separate Utah from the conterminous states of Idaho, Wyoming, Colorado, Arizona and Nevada. The arable lands are mainly confined to a narrow zone skirting the foot of the Wasatch range irrigated by freshwater streams from the upland valleys. The Mormons having taken possession of this fertile tract, nothing remained for later immigrants in a region which had well been named the "Desert" by the first arrivals. Of over 80,000 whites all but about a thousand were Mormons in the year 1869, when speculators and miners were suddenly attracted by the discovery of rich argentiferous lead veins. Despite the hostile attitude of the "Saints" and the massacres organised by them in association with their Indian allies, the Gentiles have gradually acquired the ascendency in some of the towns, while the Mormons are still in a majority in the rural districts. Legal and political complications of all kinds, caused by the antagonism of two populations with different laws and usages, have hitherto prevented Congress from admitting Utah into the number of sovereign states. Since 1891, however, the chief obstacle has been removed, a new revelation having definitely condemned polygamy. Those Mormons who have refused submission to this innovation have mostly emigrated, especially to the Mexican province of Chihuahua, where they have received concessions of at least 125,000 acres (1891).

Salt Lake City, capital and metropolis of Utah, was founded in 1847 by the Mormons near the right bank of the Jordan, 11 miles above its mouth in the Salt Lake. Eastwards rises the chain of the Wasatch Mountains, and the city, being divided into uniform blocks by broad shady avenues irrigated by running waters, is one of the cleanest and healthiest places in America. The "Tabernacle," its most conspicuous and one of its ugliest buildings, forms a rotunda with flattened dome, beneath which from 8,000 to 10,000 of the "Latter-Day Saints" congregate. A spur of the hills, three miles to the east, is crowned by *Fort Douglas*, where a Federal garrison supports the United States executive. *Provo City*, on the east side of Lake Utah, and *Ogden City*, on a plain west of the Great Salt Lake, are convenient centres of trade at the converging points of several railways.

6.—New Mexico.

New Mexico has preserved the collective name given by the Spanish conquerors to all their possessions north of the Rio Grande, which have been carved by the Americans into several states. As at present delimited it forms an almost perfect square, broken only by the little quadrangular annex of the Mesilla valley in the south-west corner. The cultivable and inhabitable districts are

GENERAL VIEW OF SALT LAKE CITY.

mainly confined to the valleys of the Rio Grande, which traverses the state from north to south, of the parallel Rio Pecos and of a few lateral streams and elevated

Fig. 196.—Sunrise in the American Fork Canon, Utah.

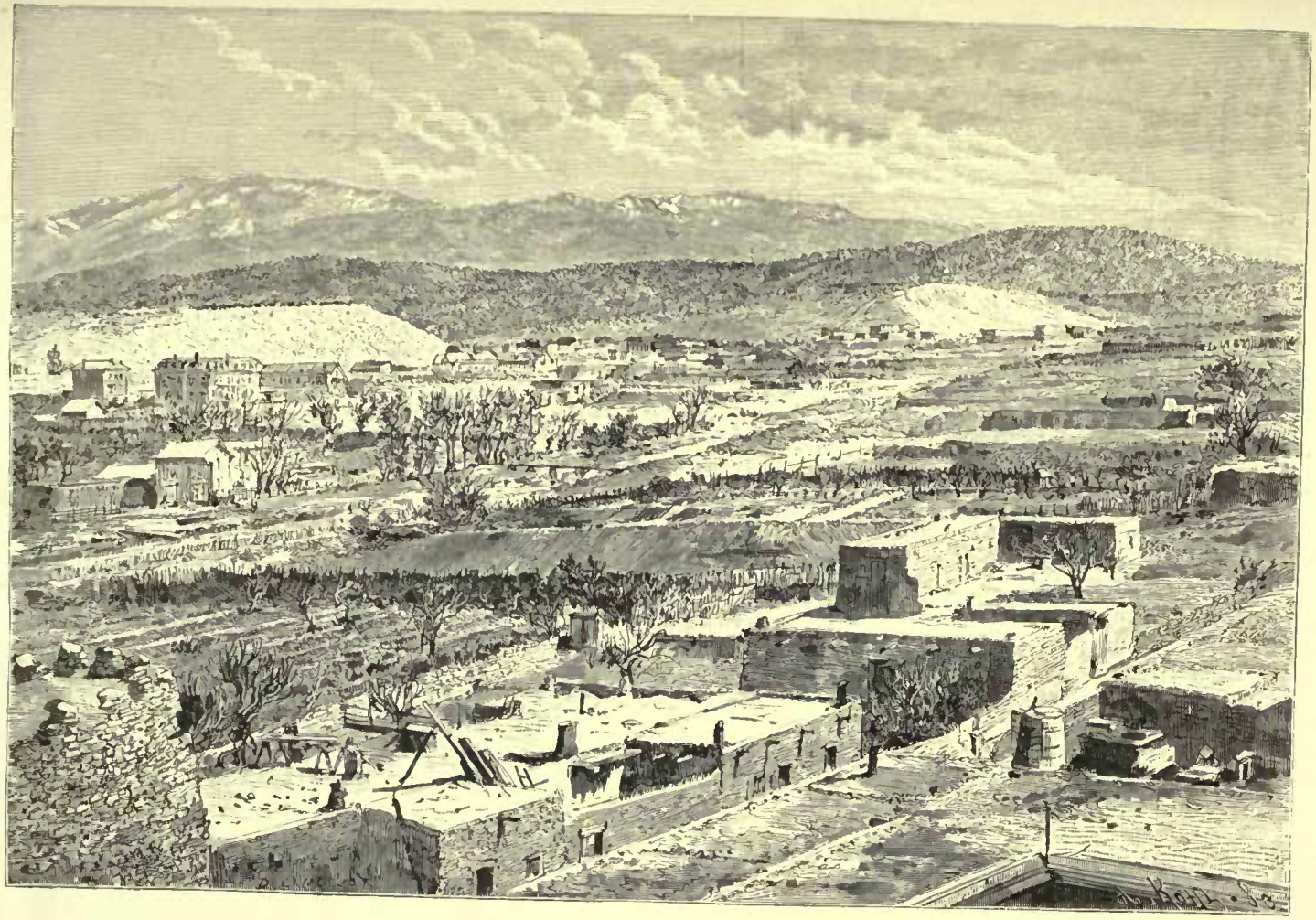
plains. Nevertheless, settlers have also been attracted by the mines of the precious metals to the mountainous regions beyond the alluvial bottom-lands.

Although half a century has elapsed since the annexation, the Spanish communities still preserve their language and usages, and it is probably owing to this fact that New Mexico has not yet been admitted to the number of Federal States. In 1890 nearly a third of the 508 primary schools gave no instruction in English, and in most of the villages communal affairs are still discussed in the Spanish language. The vast domains claimed by the old Mexican landowners against the Anglo-American speculators also create a special situation in New Mexico. There are several Indian reserves, such as that of the

Fig. 197.—Rio Grande Valley in the Centre of New Mexico.
Scale 1 : 900,000.

Mescaleros, an Apache tribe, between the Sierra Blanca and the Sierra del Sacramento, east of the Rio Grande.

In the valley of the Rio Pecos (Puerco), a narrow channel flowing between two deserts, there were till lately scarcely any groups of habitations beyond a few wretched hamlets founded before the construction of irrigating canals. But it has now been discovered that the hard bare soil brought down from the mountains by the glacial torrents needs nothing but water to become highly productive land, and large companies have consequently been formed to develop the agricultural resources of this region. The arable tracts comprise about 500,000 acres, belonging to the National Domain, and these tracts appear to have formerly been densely peopled. Whole cartloads of painted potsherds, says Bandelier, may here be collected from the refuse left by the aborigines. *Las Vegas*, that is, "the



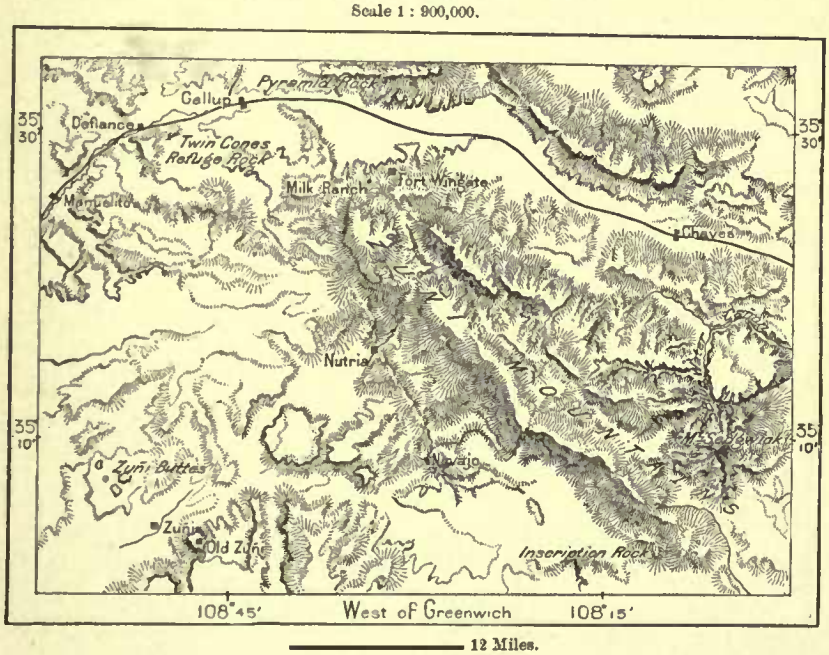
GENERAL VIEW OF SANTA FÉ, CAPITAL OF NEW MEXICO.

Plains," a pleasant little town standing at an altitude of over 6,500 feet in a lateral valley of the Pecos, at the foot of mountains with copious mineral springs, is the natural centre of this region, as well as one of the most frequented health resorts in the West.

The valley of the Rio Grande, being better watered and lying nearer to the mining districts, as well as to the Mexican provinces, whence it has been colonised, is also more thickly peopled. But although it is traversed by the great international trunk line running from Chicago through Denver to Mexico, *Santa Fé*, capital of the state, lies not on the banks of the Rio Grande, but in the lateral valley of the Rio Chiquito, some 20 miles west of the main stream. This place was the chief centre of population, even before the arrival of the Spaniards, who first penetrated into the district in 1542, but formed no permanent settle-

Fig 198.—Land of the Zuñi Indians.

Scale 1 : 900,000.



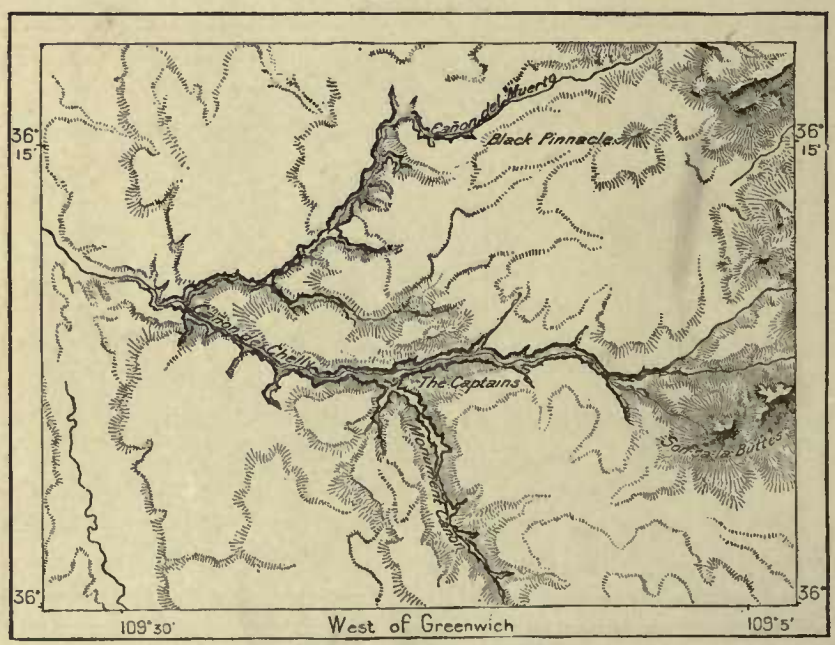
ments till the following century. One of their churches had been erected as early as 1627; but their possession of the country was long contested by the Indians, and when they obtained permission to remain in 1704, it was only on condition of abstaining from working the mines. But the Americans are hampered by no such conventions, and numerous deposits are already being worked in the Santa Fé district. The city itself is said to stand on some argentiferous beds, and the ores extracted from the very streets are reported to have yielded over $200 per ton. Santa Fé has preserved its antique aspect, half Indian, half Spanish, with irregular streets and low houses, built of adobe or sun-dried bricks. The old "governor's palace" still stands, a low structure with a peristyle of slender wooden columns.

A few Indian villages inhabited by civilised aborigines, to whom the

Americans have, by a strange misconception, applied the collective name of "Pueblos," * have held their ground in the Rio Grande valley, both north and south of Santa Fé. The best-known village is that of *Taos*, in a western valley of the Sangre de Cristo Mountains. Another, in a lateral valley of the Rio Grande, has received the name of *Jemez* from the Spaniards, though its inhabitants call it *Vallatoa*. In the vicinity are dozens of thermal springs, the so-called *Ojos Calientes*, much frequented by invalids. In the west, on the Arizona frontier, live the Zuñi; who, however, are now stationed in a valley not far from their former villages, which were perched on rocky crags. In the neighbouring gorges, and especially in the cañon of Chelly, are seen some of those astonishing domiciles formerly occupied by the Cliff Dwellers. The industrious Navajos,

Fig. 199.—The Chelly Cañon.

Scale 1 : 450,000.



northern neighbours of the Zuñi, fabled to have sprung from a maize cob, are unrivalled in America for the manufacture of woollen blankets.

Albuquerque, which has the advantage of lying in the Rio Grande valley at the converging-point of the natural highways of the country, has recently taken rank as the chief city of New Mexico, if not for population at least for commercial activity. A completely new town of American aspect has sprung up beyond the enclosures of the decayed old Spanish quarter. Eastwards rises the superb mass of the Sierra de Sandia, where are the ruins of a church said traditionally to have belonged to the mythical city of *Gran Quivira*.

* Pueblo is a Spanish word meaning town, village, or commune; hence designates no particular tribe, but has not inappropriately been applied generally to all these settled Indian communities, living in the peculiar "pueblo" or village, in contradistinction to the Prairie Indians, living in tents.—Ed.

7.—Arizona.

The territory which has received the name of Arizona, that is, "Arid Zone," has been entirely carved out of the lands ceded by Mexico in 1848 and 1853. Like most of the states, especially in the west, it has been geometrically delimited

Fig. 200.—The "Captains," Chelly Cañon, Arizona.

by degrees of latitude and longitude except on the west, where the course of the Colorado separates it from California and Nevada, and on the south-west, where a line disposed obliquely to the meridian serves as the frontier towards Mexico.

Having the same soil and climate as New Mexico, Arizona presents arable tracts only in the well-watered bottom-lands. Although an irrigation canal completed in 1882 is nearly 40 miles long and waters many thousand acres, artificial irrigation has not yet been extended to a thousandth part of the whole surface.

Hence the economic value of Arizona is due principally to its gold, silver, and copper mines. Even diamonds are found, as well as deposits of magnificent garnets, and petrified forests transformed to agate and jasper.

Although Arizona has formed part of the republic for over forty years, its population still falls far short of the number required for admission into the Union as a state, and a large part of that population still consists of Mexican miners. There are several Indian reservations, those of the Hualapais in the north-west, of the Yumas in the south-west, of the Navajos and Moqui in the north-east, and of the Apaches, Pimas, Maricopas, and Papagos in the south. The latter dwell in Spanish-built villages, whereas the Moqui (Moki) still occupy four almost inaccessible cliffs, where they were long able to defy the attacks of the Navajos and Apaches. Their *estufas* are no longer temples, but serve as workshops occupied by the weavers during the heat of the day. The Apaches, formerly the terror of the Mexican settlers, have all been reduced, and either confined as prisoners of war in the forts or settled as peaceful peasantry along the banks of the upper Gila.

Tucson, former capital of Arizona, is the oldest place in the country; here the Spaniards had erected their first military post, and the finest church in the country stands a little to the south in the village of *San Javier del Bac*, where there is a settlement of 6,000 Catholic Papagos. But Tucson has been displaced as capital by the American city of *Phœnix*, which also lies in the Gila basin near the centre of the territory. The mining town of *Prescott*, situated farther north, is commanded by *Fort Whipple*, headquarters of the Federal troops in Arizona. Along the banks of the Colorado follow a few riverine ports; the most important is *Yuma*, or *Arizona City*, facing Fort Yuma on the Californian side just below the Gila confluence.

8.—Nevada.

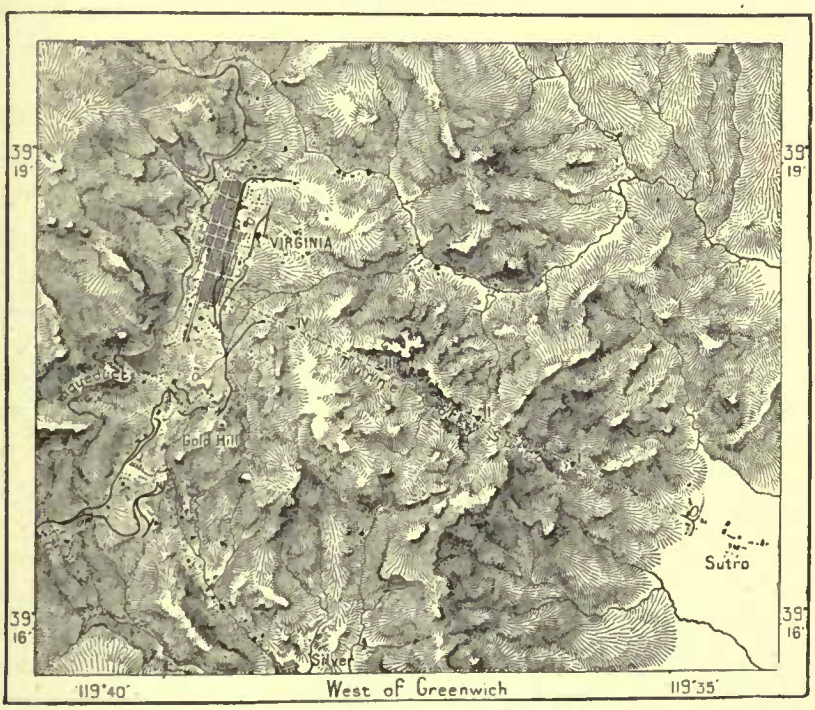
Already a sovereign state, despite the small number of its inhabitants, Nevada is one of the least densely peopled regions in the Union, thanks to the great elevation of its plateaux, and its bare rocky or arid clayey soil. Even its rich silver and other mineral stores can contribute little to its settlement, for the monopoly of the mining districts by the great capitalists prevents all individual enterprise. Politically this vast region is a "rotten borough," which during the decade from 1880 to 1890 has even decreased in population. The aborigines, mainly of the Shoshonean family, are still represented by a few groups, all now settled in reserves. The whole of the state belongs to the region of closed basins, except the northern and southern districts draining to the Columbia and Colorado respectively.

Carson City, the capital, lies in the mountainous and wooded region near California, on a torrent flowing to Lake Carson. *Virginia City*, the largest place in the state, is situated in the same river valley north-east of Carson at the famous Comstock Lode silver-mines, near *Gold Hill* and *Silver*, all these places

SILVER IN THE NEVADA SILVER-MINING DISTRICT.

being disposed along the main axis of the lode at the east foot of Mount Davidson (7,941 feet). The shafts are sunk to various depths, down to 3,100 feet; but the heat is terrific, rising to 120° Fahr. at a depth of 2,350 feet. The cavities between the granite rocks of Mount Davidson and the green porphyry masses of the plateau are flooded with water from springs with a temperature of 158° Fahr. In order to render mining operations possible in the stifling atmosphere of these lodes, the richest in the world, it has been necessary to excavate an underground gallery 6,730 yards long, which begins 7,770 feet under Mount Davidson, and after a fall of some 3,300 feet terminates at an elevation of 4,500 feet on the plain of *Sutro* traversed by the Carson torrent. All operations are arrested below

Fig. 201.—Virginia City.
Scale 1 : 60,000.



the gallery, where the atmosphere is suffocating. In recent years the population of Virginia City has fallen from 35,000 to less than 9,000.

9.—Washington.

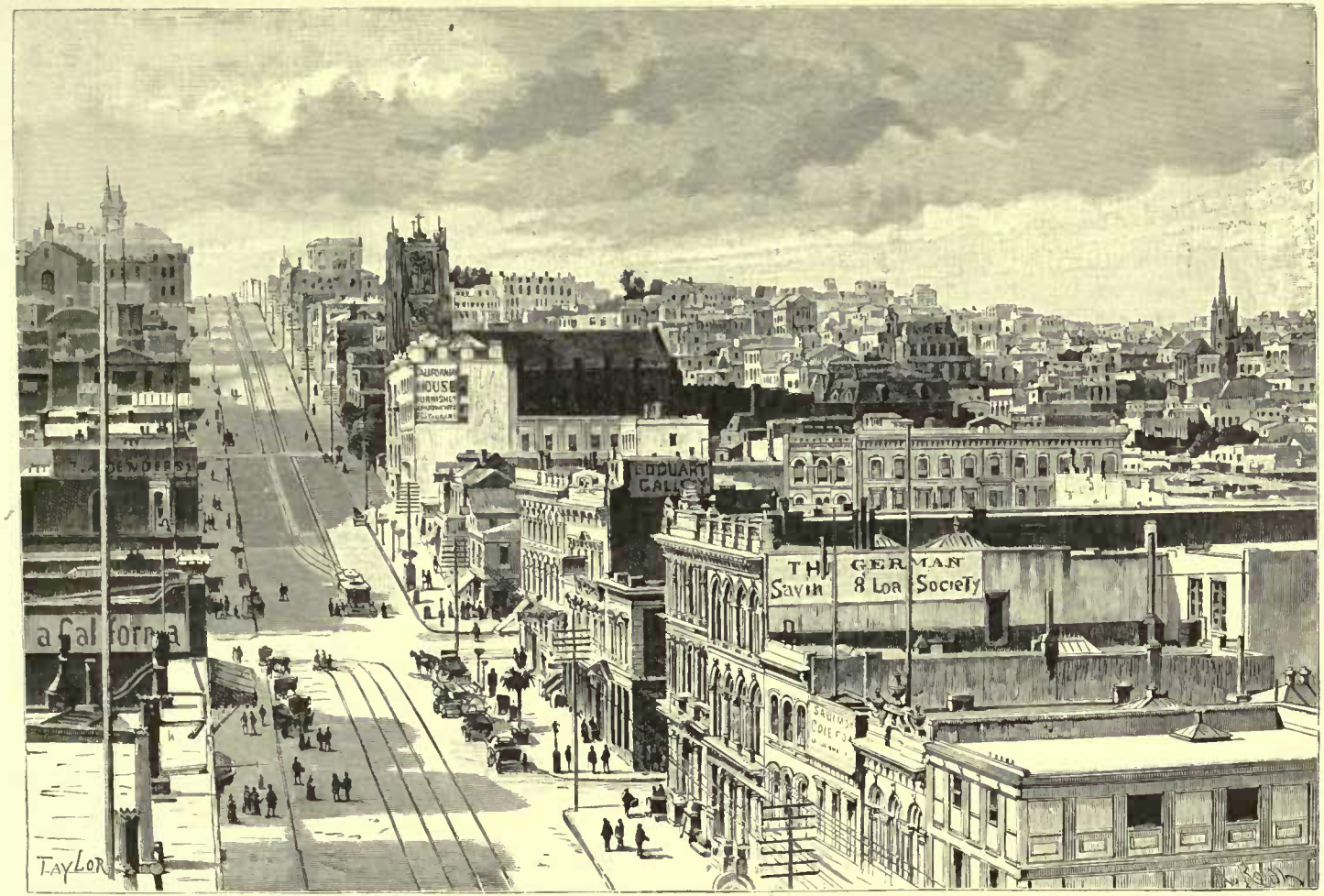
The state, which has received the name of the first president of the republic, is one of the most prosperous despite its remoteness from the great centres of trade and migration. In 1853 it still formed part of the unorganised territory of Oregon, and when constituted a separate administrative division, it was so destitute of communications that only a few pioneers ventured to settle in the country. In 1880 the population was still under 75,000; but its prosperity began with the completion of the transcontinental line connecting San Francisco with New York.

The climate, severe on the uplands, is very salubrious, and every valley has its running waters; a marvellous group of havens ramifies from Puget Sound into the interior; fertile tracts stretch over the vast plains between the Cascade and Coast Ranges; the slopes of the mountains are clothed with magnificent timber, and the underground stores of coal, iron, and the precious metals have already been tapped. Hence the population is increasing with marvellous rapidity, and towns till recently unheard of are already busy commercial and industrial centres. The Indians, formerly very numerous, still possess a few reserves, which, however, they find it difficult to defend from the white intruders.

Numerous towns have sprung up round the ramifying shores of Puget Sound. South of *Blaine*, the frontier town towards Canada, where the two sections of the international trunk line are connected, *Whatcom* is followed by *Mount Vernon* at the mouth of the Skagit; *Snohomish* below the cascades of the river of like name, and *Seattle* facing *Port Madison* and *Port Blakeley*, both on an island near the west side of the sound. Seattle, by far the most flourishing of all these places, is rivalled by *Tacoma*, which was suddenly transformed from an obscure hamlet to a commercial city by the completion of the North Pacific Railway, which reaches the coast after surmounting the Cascade Range by a tunnel two miles long under Stampede Pass. It already trades with China and Japan, and its inhabitants have named it the "City of Destiny," as if to proclaim its future rank among the cities of the Pacific seaboard. The port of *Steilacoom* follows Tacoma on the east side of Puget Sound near its southern extremity, where *Olympia*, capital of the state, has been founded. On the west side of the sound the busiest place is *Port Townsend*, whose harbour, nowhere under 30 feet in depth, lies on the route of vessels plying in the Juan de Fuca Strait. On the Pacific coast *South Bend*, terminal station of the Northern Pacific, stands at the mouth of the Wyllapa or Shoalwater Bay, which despite its name has a depth of at least 20 feet at ebb and 30 feet at flow. In the interior the only noteworthy places are *Vancouver* on the right bank of the Columbia, a little above the Willamette confluence; *Walla Walla*, an old station of the Nez Percés Indians; and *Spokane*, which since 1880 has been rapidly developed, and is now the chief trading and industrial centre in the eastern part of the state.

10.—Oregon.

Oregon, which has retained the name formerly applied to the Columbia River, has the massive quadrangular shape common to most of the Western States. Nevertheless, it has for natural limits the sea on the west, and the course of the Columbia on the north nearly as far as Walla Walla under 46° N., while half of its east frontier is traced by the course of the Snake River. Its progress has been retarded by the cold, damp climate, its remoteness from the centres of migration, and the small extent of arable lands. Nearly all the eastern section between the Cascade Range and the plateaux traversed by the Snake River is too bleak and elevated for tillage, and here the only resource is stock-breeding, the bunch-grass yielding an abundance of fodder at all seasons. A great part of the

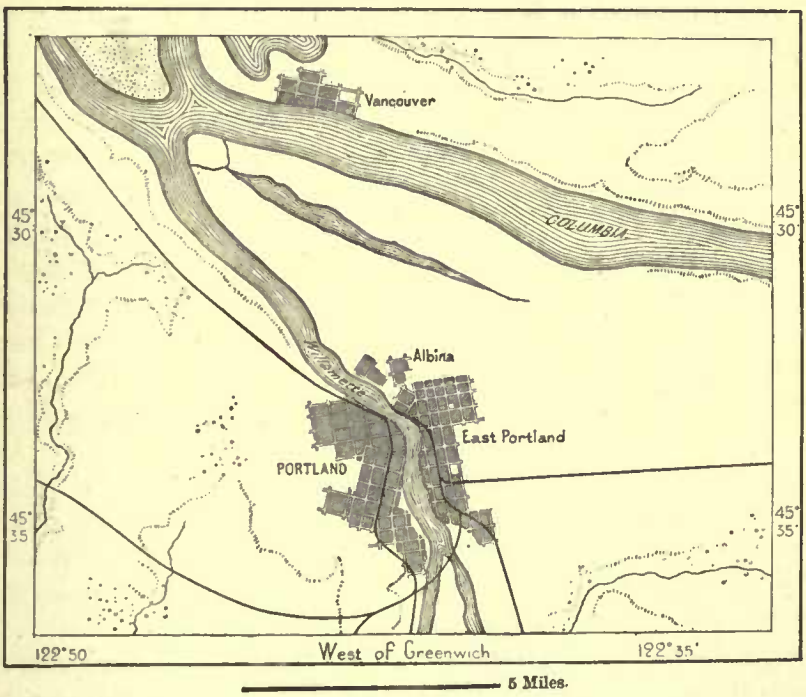


STREET VIEW IN SAN FRANCISCO.

west also, formerly under gigantic forest growths, is occupied by rugged mountains or steep hills, but the bottom-lands are extremely fertile, and according to the local saying, there are no bad harvests in Oregon.

At the beginning of the century the only white settlers were some Franco-Canadian trappers, one of whose stations is still maintained at *Gervais*, in the Willamette valley. The first Anglo-American log-hut dates only from 1810, and the country remained so long unoccupied that it was held in common by Great Britain and the United States for the thirty years ending in 1846, when it was at last found necessary to define the limits of the conterminous powers. Then the discovery of gold in California and the cession of that region by Mexico, attracted swarms of immigrants to the shores of the Pacific, and Oregon took its part in the

Fig. 202.—Portland, Oregon.
Scale 1 : 225,000.



general movement, especially when gold was here also discovered. Still agricultural produce—cereals, hops, hemp, wool—and the salmon fisheries have more economic value than the mining industry.

Four-fifths of the population is centred in the rich Willamette valley, the "Garden of the North-West," which is traversed by the coast line between British Columbia and Mexico. Here are situated *Eugene City*, an agricultural centre; *Cornwallis*, where the transcontinental line branches off westwards to *Newport* on the Pacific; *Salem*, the pleasant capital of the state; *Oregon City*, a manufacturing town which derives its motive power from the neighbouring falls of the Willamette; and *Portland*, a flourishing mart which has recently absorbed the suburbs of *East Portland* and *Albina* on the opposite side of the river, is the

commercial capital, and the centre of all life and enterprise in the state. Although 110 miles from the Pacific, Portland is really a seaport, with direct steam communication through the Willamette and the Columbia with San Francisco, New York, Japan, and China. It is also connected by the North Pacific Railroad with Chicago and the Atlantic, while other lines radiate in all directions. *Astoria*, at the mouth of the Columbia, is the oldest white settlement on this part of the coast, having been founded in 1811 by the peltry trader Astor, from New York.

11.—California.

On the Pacific slope the preponderance belongs necessarily to California, which possesses the magnificent inlet of San Francisco Bay, and which is one of the great states of the Union, comprising a seaboard of nearly 10 degrees of latitude, and stretching inland beyond the coast ranges and Sierra Nevada to the Great Basin. North and south it is conterminous with Oregon and Lower California (Mexico), while eastwards it is separated by conventional lines meeting at Lake Tahoe from Nevada, and by the course of the Colorado between Forts Mohave and Yuma from Arizona. Thanks to its equable and temperate climate California seems more suited for the residence of man than any other region of North America. The chief part of the state, formed by the double oval-shaped valley of the San Joaquin and Sacramento Rivers, is alluvial land of great fertility wherever water is available. Much of the southern region on the seaward slopes of the Coast Range is very fertile, and when irrigated produces great quantities of oranges, lemons, olives, and raisins. East of the San Bernardino Range the Mohave and Colorado Deserts are rocky, clayey, or saline wastes, an absolutely barren "land of death." The productive northern and central tracts yield some of the finest wheat, as well as the best fruits and wine, in the Union. The state also stands first for the production of gold, though the yield has fallen off by one-half, and it is the only state possessing mines of quicksilver. Its position at the convergence of several oceanic routes also gives it great industrial and commercial advantages, although San Francisco no longer possesses the monopoly in this respect which it recently enjoyed on the Pacific seaboard.

Owing to the rush of miners and adventurers soon after the annexation of this El Dorado, the old Mexican population, pure or half-caste, was rapidly swept aside by the stream of immigration, comprising English and Americans, Germans, French, Italians, Scandinavians, and Russians, besides yellow and black elements, in a word, peoples of every race and speech. At first the female sex was absent, but the equilibrium has since been re-established, and all the heterogeneous white elements are now being gradually fused in a uniform Californian type. The Chinese immigration, the "yellow invasion," as it was called, has been almost entirely arrested by special legislation inspired by the rivalry of the white proletariates. The Mexican settlers, all but the rich landowners, have been driven to the interior, where they form a degraded population, largely half-breeds, often contemptuously called "Greasers." The pure Indians also, whose tribes were reckoned by the dozen before the arrival of the gold-seekers, have been more

25. 25 to 50. 50 upwards.

summarily dealt with than in any other part of the Union. The Modocs, who held out longest in their natural strongholds amid the lava-fields north-east of Lassen Peak, were mostly exterminated, and the survivors removed to Montana.

North of San Francisco almost the only trading-places are the little ports of *Crescent City*, *Eureka*, and *Bodega*, which were formerly fortified by the Russian Alaska Company; hence the name of Russian River given to the watercourse which here reaches the coast. *Sacramento*, capital of California, lies on the left bank of the river of like name at its confluence with American River. This place being exposed to periodical floodings, it was decided after the disastrous inundations of 1861 to raise the level of the whole city, and the project was successfully carried out with a skill and energy almost unexampled even in the United States. Whole streets, with their houses, furniture and all, were shored up and slowly raised from 10 to 16 feet above high-water level without a single accident.

In the more arid San Joaquin basin the best-known place is *Mariposa*, which, lying near the Yosemite Valley, is much frequented in summer. Farther south the old Spanish settlement of *Fresno* has become the greatest market for the grape trade in the whole Union. Thousands of boxes of raisins and fresh grapes are annually forwarded to *San Francisco*, largest city on the Pacific coast between Bering Strait and Cape Horn. Founded by the missionaries in 1776, perhaps on the spot where Drake cast anchor during his memorable voyage round the globe, this great emporium was only an obscure village of a few hundred inhabitants at the time of the annexation. But after the discovery of the gold-mines, San Francisco de Yerba Buena, familiarly called *Frisco*, became a busy seaport, and increased rapidly. It occupies the northern extremity of the peninsula, which projects northwards at the entrance of the bay, and which is separated by the channel of the Golden Gate from the opposite headland projecting southwards. In order to deepen the water at the quays, the shallower part of the roadstead was filled in with the sandy dunes of the peninsula; the inner beach was thus enlarged by about two miles in width, and the quays were advanced to the new shore-line, where the largest vessels can ride at anchor in 45 or 50 feet of water. Thus also was secured an admirable site for the growing city, which already covers a space of over 40 square miles. The central thoroughfares are flanked by sumptuous residences, and the City Hall is a superb structure, adorned with towers, domes, and colonnades. The public gardens of the interior are supplemented by handsomely laid-out cemeteries in the outskirts, and by splendid promenades on the dunes skirting the Pacific, and terminating at Cliff House, whence a panoramic view is afforded of the Golden Gate and surrounding waters. Steam ferries ply incessantly across the bay between San Francisco and the towns on the east side, such as *Oakland*, terminus of the transcontinental railway lines; *Berkeley*, seat of the State University; and farther south, *Palo Alto*, where Senator Stanford has founded and richly endowed another university, to which he has given the name of his deceased son, Leland Stanford. *Benicia*, official capital of California before Sacramento, stands on the Carquinez Strait, flowing between the inner bays of San Pablo and Suisun. All the river

steamers ascending the Sacramento or the San Joaquin necessarily touch at Benicia or *Martinez*, on the south side of the same strait, which is accessible to vessels of 3,500 tons burden. The foreign exchanges of San Francisco already exceed $85,000,000, while the shipping represents a collective burden of over 2,000,000 tons. At the local mint a sum of about $20,000,000 is annually coined, and the silver from the Nevada mines is forwarded through this seaport.

San José, or *Ozé*, as its inhabitants call it, is the chief place in the alluvial district stretching between two parallel ridges south of San Francisco Bay. It promises soon to form one city with its western neighbour *Santa Clara*, and thanks to its geographical position it commands the overland communications of San Francisco with the rest of the United States and with Mexico. The village of *New Almaden*, at the south end of the Santa Clara valley, is the centre

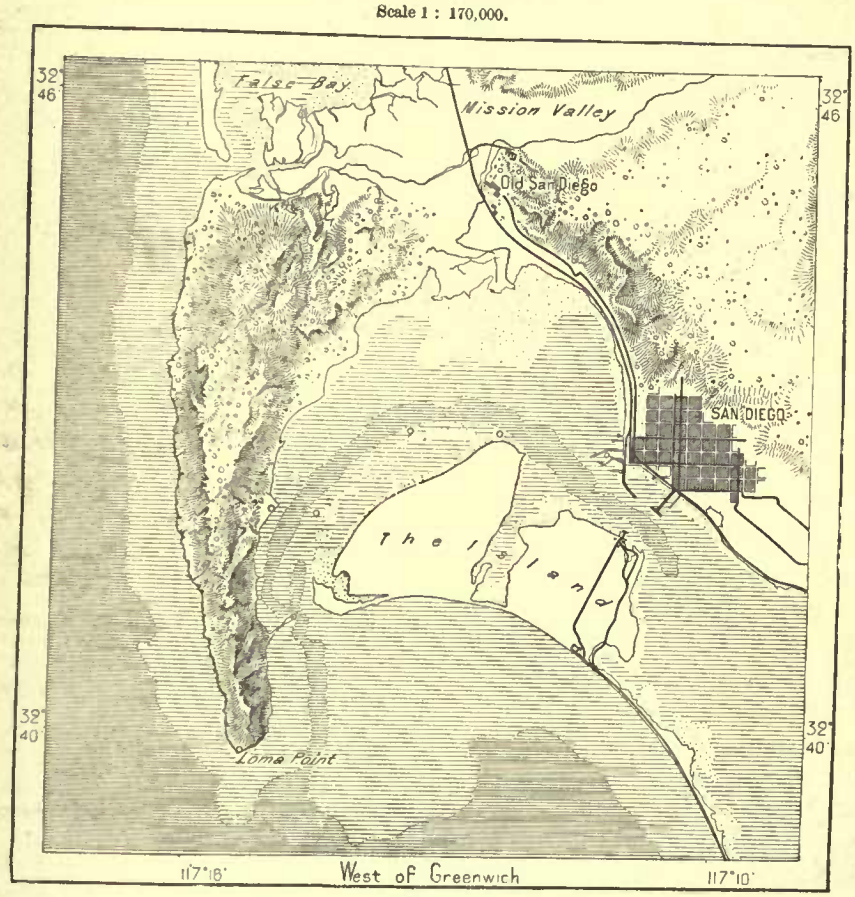
Fig. 203.—Los Angeles.
Scale 1 : 1,700,000.

of the most productive quicksilver-mines in America. The old Spanish town of *Monterey* (*Montery*), founded in 1770 on the south side of Monterey Bay, lower down the coast, was the capital of California while that province belonged to Mexico, and since the completion of the railway connecting it with San Francisco it has become one of the most frequented watering-places on the Pacific slope. A few other little seaports, such as *San Simeon*, *San Luis Obispo*, and *Santa Barbara*, follow along the south-west coast; but in this region the most important place is the more inland town of *Los Angeles*, that is, *Reina de los Angeles*, or "Queen of the Angels," which was founded as a Mexican missionary station in 1781, and is now the second city in California. Standing at the foot of a sierra, on the best-watered plain in the south, it has naturally become the chief industrial and trading centre of this region. The banks of the streams traversing the city resemble a vast garden, abounding in oranges and other fruit-trees. Strawberries ripen all the year round, and here is the famous Santa Barbara vine, which yields

VIEW OF THE SEAL-ROCKS FROM THE "CLIFF HOUSE," SAN FRANCISCO.

a yearly crop of from 9,000 to 10,000 pounds of grapes. The neighbouring little watering-place of *Santa Monica* is followed down the coast by the port of *Wilmington*, where are shipped the cereals, wine, wool, and other produce of the district, sent down by a branch of the Southern Pacific line. Beyond Wilmington follows *San Diego*, at the mouth of the river of like name, and on a deep marine inlet close to the Mexican frontier. San Diego dates from

Fig. 204.—San Diego.
Scale 1 : 170,000.



the year 1769, and is consequently the oldest Californian settlement within United States territory. Since the annexation it has become an active commercial centre, which it was hoped might one day rival San Francisco itself. During a period of reckless speculation it is said to have had as many as 75,000 inhabitants and visitors, and since the completion of the Southern Pacific Railway it has at least the advantage of being the nearest Pacific seaport to the Gulf of Mexico.

CHAPTER IX.

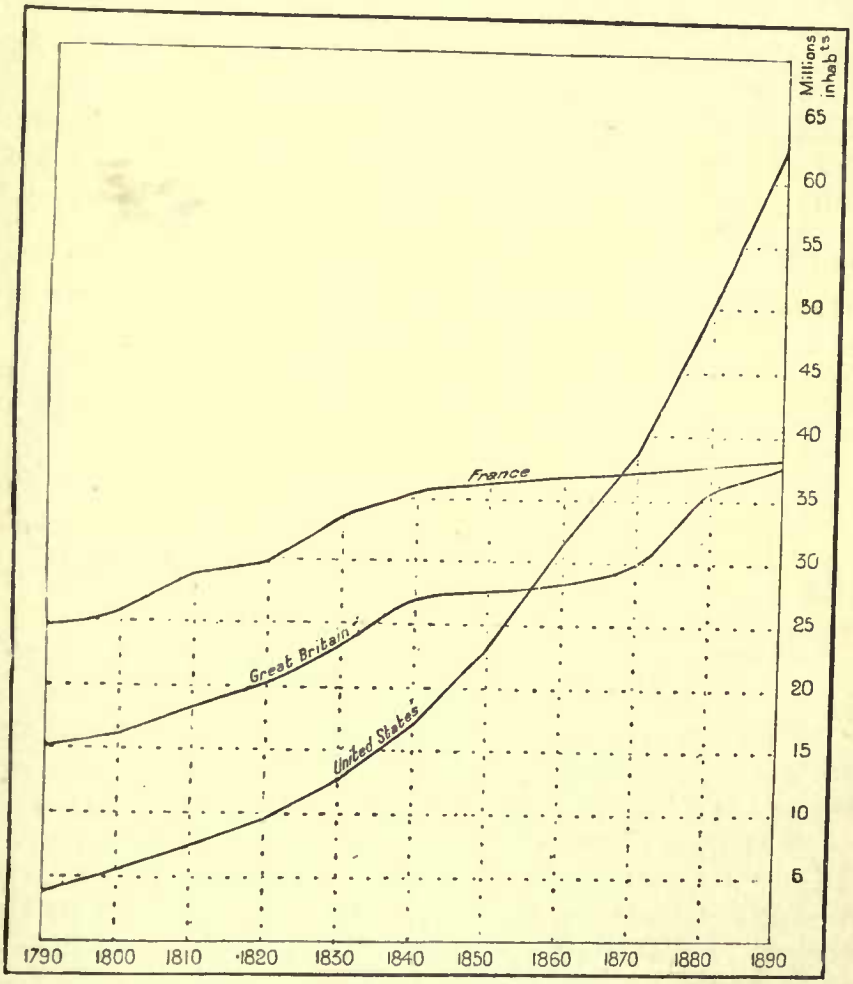
SOCIAL AND MATERIAL CONDITION OF THE UNITED STATES.

THE regular decennial census taken since 1790 has invariably borne witness to the rapid growth of the population, which has increased sixteenfold (from nearly 4,000,000 to 63,000,000) in the century ending in 1890, while the national resources have been developed even at a more rapid rate. In respect of population the Union has already outstripped both France and Great Britain by more than one-third, though the inhabitants would be counted by hundreds of millions were the land as densely peopled as those states. There can be no doubt that serious errors have affected the value of some of the decennial returns, and all American statisticians admit that complete reliance cannot be placed in that of 1870, especially as regards the Southern States, which at that time were still convulsed by social troubles and here and there even by a fierce war of races. Hence errors especially of omission were so numerous that efforts were afterwards made to replace the official figures by calculations based on comparisons with previous decennial returns. The opinion prevails that even in 1890 the results were often defective, as shown by the census of New York City, which, it is claimed, fell short of the actual number by about 200,000 souls. Nevertheless the census as a whole is sufficiently accurate to throw light on the more salient demographic phenomena.

As regards the extremely unequal distribution of the population the maps prepared by Gannett are highly instructive, as showing at a glance the influence of the environment, altitude, temperature, rainfall, soil, mineral resources, facilities for trade, as well as of the origin and history of the settlements, on the general distribution and relative density of the populations. Thus Gannett's researches make it evident that districts exposed to great extremes of temperature or of moisture are never very thickly peopled. Assuming that the mean temperature of the United States, excluding Alaska, coincides with the isothermal line of 53° Fahr., three-fourths of the inhabitants are found to be grouped in a zone comprised between the isothermals of about 45° and 59° Fahr. Below 41° and above 70° Fahr. the population is everywhere thinly distributed. So also, if the mean rainfall of the United States be taken at 30 inches, a like proportion of three-quarters is found concentrated in those regions enjoying a yearly precipitation

ranging from about 29 to 51 inches. Two-fifths of the republic receive less than 10 inches; hence not more than three-hundredths of the people are represented in this arid section of the Union. According to another calculation, the mean altitude of the country being estimated at 2,500 feet, the centre of gravity of the population coincided in 1890 with about one-third of that altitude, or say 786 feet. The gradual settlement of the upper regions has raised this centre by 100 feet during the two decades between 1870 and 1890.

Fig. 205.—Comparative Increase of Population in the United States, Great Britain, and France.

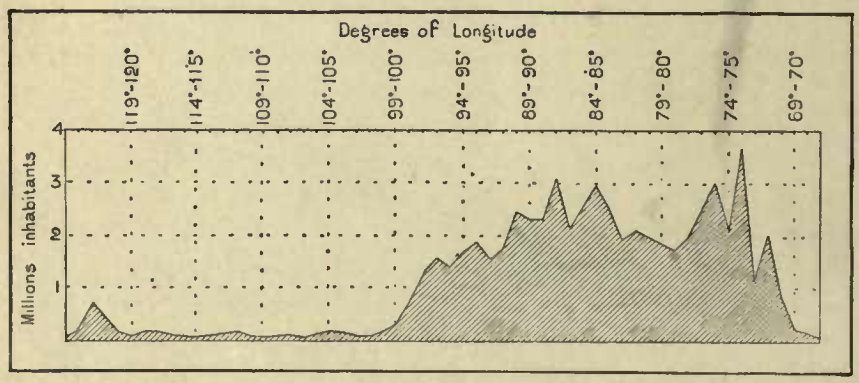


But the most striking contrast is that presented by the eastern and western sections of the territory. The Atlantic slope, including that of the Gulf of Mexico, has a population twenty-five times larger than that of the closed basins of the Rocky Mountains and of the Pacific slope combined—over 60,000,000 and nearly 2,500,000 respectively. This contrast is obviously due to the extreme climate, cold or burning, of the western plateaux, their arid soil and the difficulties of the communications. Allowance should also be made for the great distance sepa-

rating these regions from the Atlantic seaboard where most of the European immigrants are landed. A subdivision of the better-peopled eastern section shows, however, that the Atlantic coastlands, where nearly all the white settlers were concentrated before the War of Independence, have in this respect lost their pre-eminence, which has passed to the central parts of the Union. The drainage area of the Gulf of Mexico alone possesses over half of the people, while the Mississippi basin contains upwards of two-fifths. Thus the central region, including the shores of the Great Lakes, comprises about two-thirds of all the citizens of the United States.

The Northern and Southern States again present contrasts both of population, of industrial activity and of material resources. Excluding the 3,000,000 inhabitants of the Rockies and Pacific seaboard, the bulk of the American people form two main divisions, of which the northern is exactly double that of the southern. Yet to the latter division must be assigned all those states which, before the Civil War, were under the control of the slave-holding aristocracy, though they

Fig. 206.—Distribution of the Population of the States according to the Degrees of Longitude.

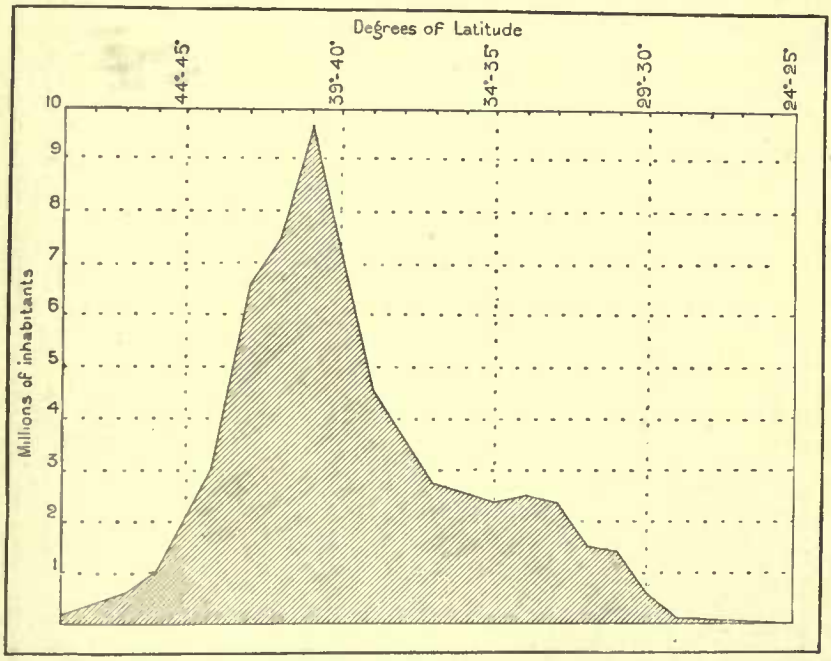


have now gravitated towards the commercial and industrial Northern States. Such are Delaware, Maryland, the District of Columbia, West Virginia, North Missouri, and a great part of Kentucky. The material advantages of the two regions are about balanced, and in many respects the southern lands are even the more highly favoured. In the north there are scarcely any districts comparable to the upland valleys of Virginia, Tennessee, and the Carolinas, or to the rolling plains of Georgia and Kentucky. Nowhere is the climate more healthy, the soil more productive, the pleasure of life more intense. Here are produced the finest races of men and animals, as regards size, strength, beauty, and graceful forms. How then does it happen that these privileged regions have not been preferred by the hundreds of thousands of immigrants who yearly land on the shores of North America? Doubtless a large part of the southern territory being hot and swampy enjoys a less favourable climate, at least for the white man. But on the other hand, the north comprises vast spaces with a more rigid climate and less bountiful soil, as well as completely uninhabitable wastes occupying over one-half of New England.

The enormous discrepancy between the two zones is clearly due to the long-standing difference in the social condition—on the one hand great landed estates till lately worked by slave labour; on the other the system of small holdings held and worked by freemen.

The urban grows incessantly at the expense of the rural population, and even more rapidly than in Europe. The difference would be even more apparent if the United States, as in France, reckoned as towns all groups of 2,000 inhabitants, instead of regarding as rural all under 8,000. In fact the town element is twice as numerous as would appear from the returns, comprising three-tenths of the whole population, even if we exclude all towns under 8,000 inhabitants. The number of large cities is increasing more rapidly than elsewhere, towns of 8,000

Fig. 207.—Distribution of the Population of the States according to the Degrees of Latitude.



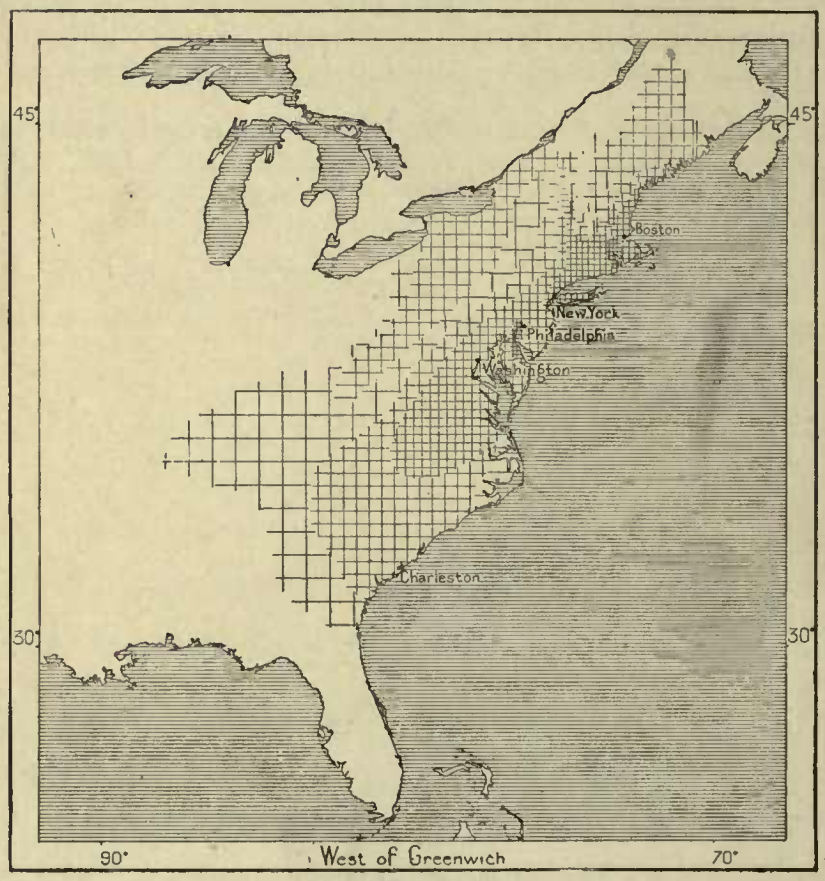
souls having advanced from six in 1790 to no less than 443 in 1890. Not one city had 100,000 inhabitants a century ago; now there are as many as twenty, of which three have over 1,000,000, and all of these stand on more ground than similar agglomerations in West Europe. Some have as many as fifteen large parks with hundreds of acres under timber, grass, rocks, streams and lakes. The cemeteries are themselves beautifully laid out as well-kept parks, in which the natural relief of the land is always respected.

In recent years many towns have sprung, one may say, ready made from the ground. Speculators or mining proprietors trace on the map the plan of the future city, with its streets, squares, hotels, schools, and public buildings, its gardens, parks, and avenues; then they build a number of railways converging on the chosen site, and puff the lots for sale through the newspapers, pamphlets,

or posters. The boom may often collapse; but at times the city really rises in the midst of the wilderness with all its industrial and civilising appliances. Thus it was that Omaha and Kansas City on the Missouri, and Cheyenne, Denver, Pueblo, and Colorado Springs on the prairies skirting the Rocky Mountains, came almost suddenly into existence. Roanoke on the Virginian plateau, and Birmingham in Alabama are also newly created places, and at present Middlesborough in Kentucky

Fig. 208.—Density of the Population at the Beginning of the Century.

Scale 1 : 24,000,000.



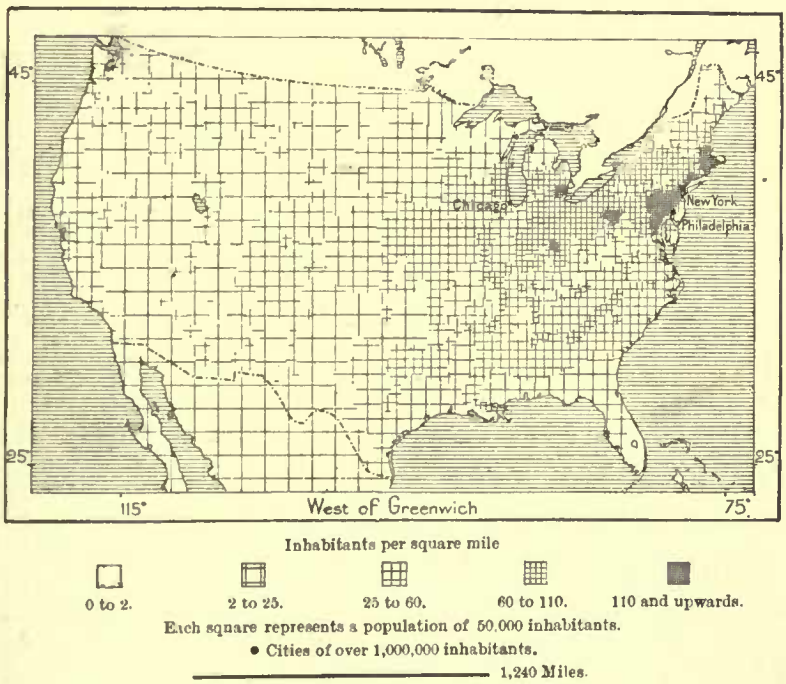
and Kensington in Pennsylvania are rising from the ground. At the end of August, 1891, Kensington was scarcely two months old, yet five large factories had already been erected on the banks of the Alleghany, and twenty-eight trains stopped daily at the new station built in a forest clearing.

The United States have, properly speaking, no capital, for Washington, seat of Congress and official residence of the President, lacks the supremacy in politics, the arts and letters which, even more than superiority in population, constitutes a true

capital. Boston was formerly the chief place in the northern colonies, and from it all Americans of New England, the "Yankees" properly so-called, were known to the Franco-Canadians as "Bostonians." Boston remains the metropolis of this region, and may claim the first rank in the Union in respect of science and education. But in population and trade it lags far behind several other places, such as New York, the "Empire City," which holds the foremost position in commerce, the money market and industry. But New York, like Philadelphia, which was for a time the seat of Congress, lies too far from the geographical centre of the Union to maintain its influence in the Far West. This is now also true of Washington, although its site seemed excellently chosen at the time of its foundation. It stood close to the geometrical centre of the thirteen original colonies,

Fig. 209.—Density of the Population in 1890.

Scale 1 : 50,000 000.



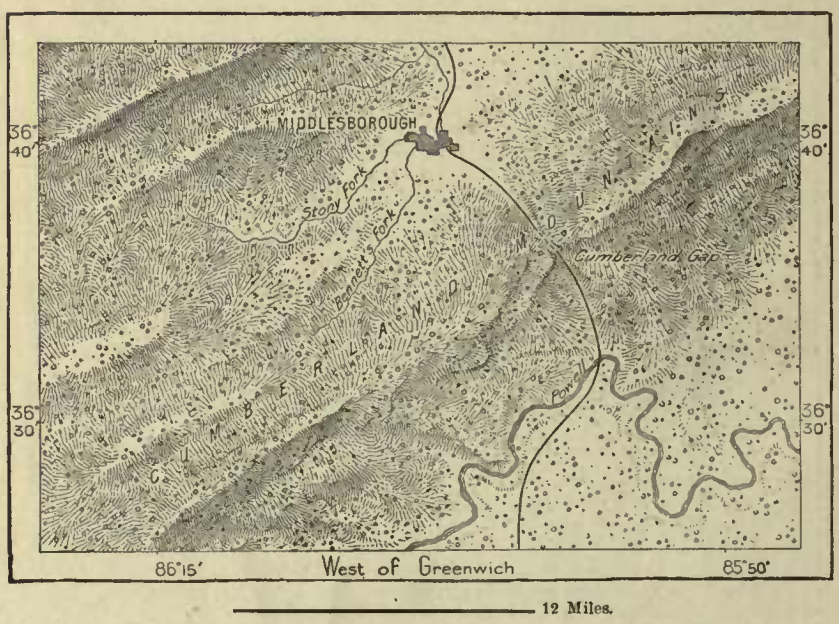
and the Federal District occupied a neutral position between the Northern and Southern States. But its importance at present is mainly strategical, as shown during the Civil War, when the main efforts of the contending forces were directed towards this central point of the Atlantic States. Naturally the populations of the Mississippi basin regard the great river as the proper site for the Federal capital. In this respect the claims of Saint Louis cannot be gainsaid, although this city is already distanced by its old rival, Chicago, which on the whole has undoubtedly the fairest prospects of becoming the future metropolis of the Union.

Although European immigration has acquired vast proportions, the American body politic is now so firmly constituted that the prodigious influx occasions not the

slightest material disturbance. It might even pass unnoticed but for the economic and social consequences of the crossings and reciprocal influences, which must have the greatest importance for the future of the United States and even of the whole world. After the War of Independence the movement was so slight that down to 1820 not more than 250,000 arrivals had been recorded. Then it began to assume large proportions, rising higher and higher with each successive decade except that of the Civil War, when there was a considerable falling off. The official returns give a total of 15,500,000 from 1820 to 1891; but since 1885 no account has been taken of the arrivals *viâ* Canada, which are probably underestimated at 540,000. Since 1870 the proportion of British, and especially Irish settlers, has gradually diminished in favour of the Germans, who represent altogether nearly three-tenths of the grand total since 1820. But this element,

Fig. 210.—Middlesborough.

Scale 1 : 500,000.



chiefly from the northern provinces of Mecklenburg, Pomerania and East Prussia, has now also entered on a period of decline. During the last two decades the decrease has been made good to some extent by colonists from every part of Scandinavia, Sweden, Norway, Denmark and even Iceland. Moreover, a stream of non-Teutonic ethnical elements has lately set in; the Italians and Slavs, driven by misery and distress, have begun to arrive in such numbers that they threaten ere long to acquire the preponderance over all others. Whether these foreign elements, so different in their usages, traditions and national temperament from the Anglo-American, may also be absorbed as readily as the kindred Teutons, is a question which has already caused some anxiety to political economists. The difficulty is certainly complicated by the undeniable inferiority in education of the Italians, Polish and Russian Slavs and Jews, who compose the bulk of this

element. Certain restrictive measures have already been proposed against this movement analogous to, if less drastic than, those taken against the Chinese in 1882. Hitherto, however, the only step taken in this direction is the exclusion of imbeciles, lunatics, criminals, the indigent and immoral women. It is obviously a question not of racial hostility but of purely economic and political considerations. The educated classes naturally object to an administration appointed by ignorant electors exercising their right of suffrage in a blind or venal way. On the other hand the American labouring classes resent the unfair competition of

Fig 211 — Scene of the Civil War.

Scale 1 : 17,000,000.

an alien proletariate tending to lower the rate of wages by a third, a half or even more.

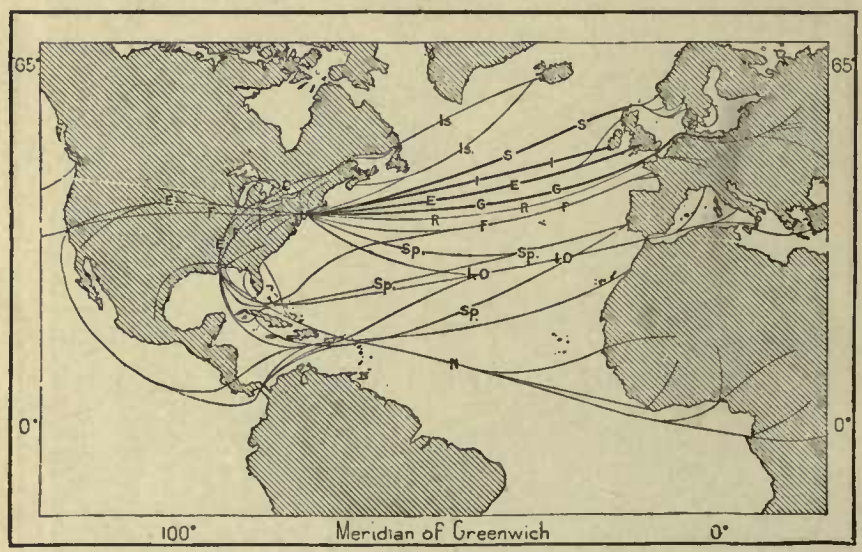
With regard to the original Anglo-American stock, there can be no doubt that, apart from some partial loss of vitality due to local causes, the race as a whole is as vigorous as ever. The terrible experiences of the Civil War revealed prodigious resources in physical energy and the solid qualities of endurance and courage amongst the millions of combatants engaged in the struggle. For size and full chest the finest men are those of Kentucky and Tennessee, and next to them the natives of Illinois, Michigan and Wisconsin. In all enterprises needing

strength, agility, skill and valour, the Americans of the east, centre and west yield the palm to none. They are even more energetic than the parent stock, and although their life is more intense, it does not appear to be the sooner exhausted on that account.

The redskins numbered altogether nearly 220,000 in 1890. That, as a body, they are decreasing is placed beyond doubt by the returns for each successive decade, though most of the tribes that have adapted themselves to the new environment are normally increasing. Thus the Iroquois nation has advanced from a little over 11,000 in 1863 to upwards of 16,000 in 1890; these, however, are largely intermingled with the whites, and many are Iroquois in little more than the name. The Etchemins of Maine, the survivors of the Seminoles in Florida, the

Fig. 212.—Streams of Immigration.

Scale 1 : 150,000,000.



E. English. G. Germans. Is. Icelanders. N. Negroes. S. Scandinavians.
F. French. I. Irish. I.O. Italians and Orientals. R. Russians. Sp. Spaniards.

3,100 Miles.

Puyallups of Puget Sound, the Dakotas, and especially the Cherokees, the Choctaws, Creeks and Chickasaws of Indian Territory, have all made some progress both in numbers and general prosperity.

But they have seldom been left to themselves, and even those who were best treated had often to choose between death or exile. In spite of solemn treaties the Creeks and Cherokees had to migrate beyond the Mississippi in 1835. They were followed by the Seminoles of Florida, while the Sioux of the Minnesota frontiers, the Blackfeet, the Crows and Paunches of the Western prairies, the Comanches of Texas, the Apaches, Navajos, and Yumas of New Mexico, the Cheyennes, Utes or Pah-Utes of the Great Basin, the Snakes, Flatheads, Modocs, and others of the Pacific slope, had all to relinquish their hunting-grounds, and now find it difficult even to defend their reserves from the encroachments of the

white settlers. Certainly the Federal Government has advanced vast sums for the purchase of the Indian domains, some $85,000,000 between 1789 and 1840, but all the money does not reach its destination, and there are few of the Government

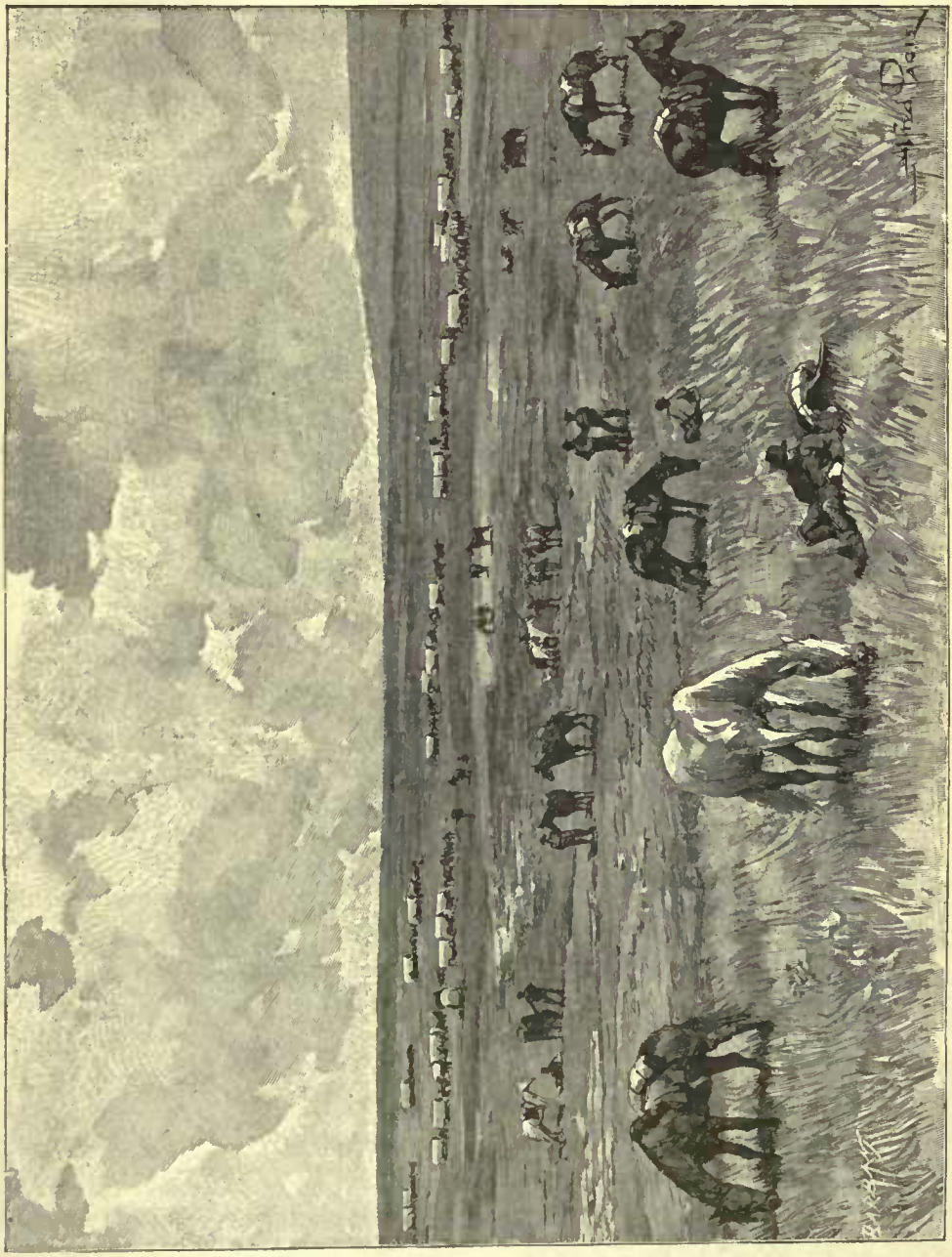


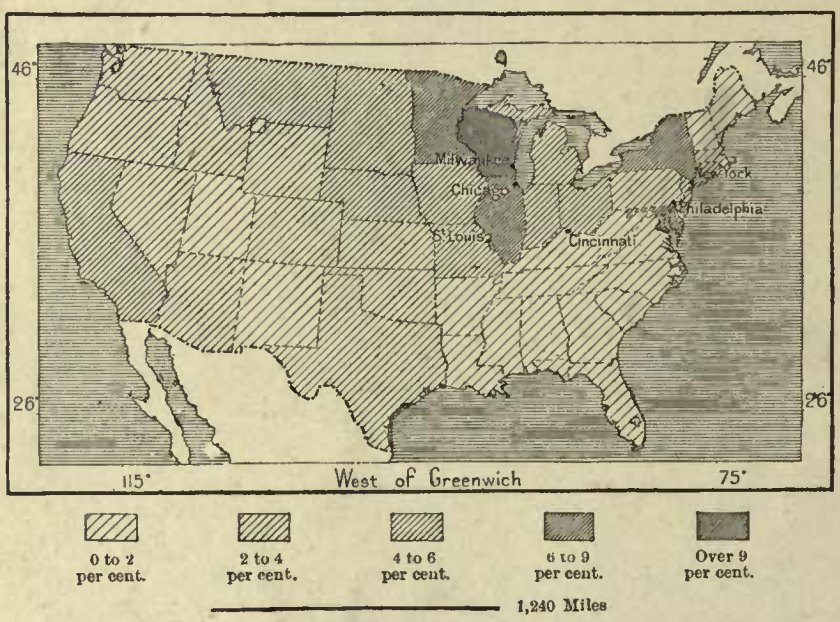
Fig. 213.—Encampment in the Alkaline Valley, Black Hills.

agents of whom the natives have not had to complain. But the present system of administration is so framed as to prevent all resistance. Before their reduction the tribes had independent chiefs in whom they could trust, men dis-

tinguished by their personal qualities of courage, skill and wisdom. But these chiefs have now become masters whose interests are distinct from those of their subjects, and who grow rich at the expense of their degraded fellow-tribesmen. To these nothing is left but to yield or to perish; they give themselves up to drink, gambling and other vices; the petty dealers hang on their steps "like wolves on the trail of the bison," and "the paleface, whiskey, smallpox, powder and shot, extermination," has become an Indian saying.

From decade to decade the extent of the reserves diminishes perceptibly, and a law passed by Congress in 1887 anticipates their complete suppression by authorising the president to proclaim the extinction of the tribe as a distinct group. By dividing the territory, like the National Domain, into squares of 160 acres, each head of a family receives an allotment, and thus there will be no more

Fig. 214. German Immigration to the States in 1880.
Scale 1 : 50,000 000.



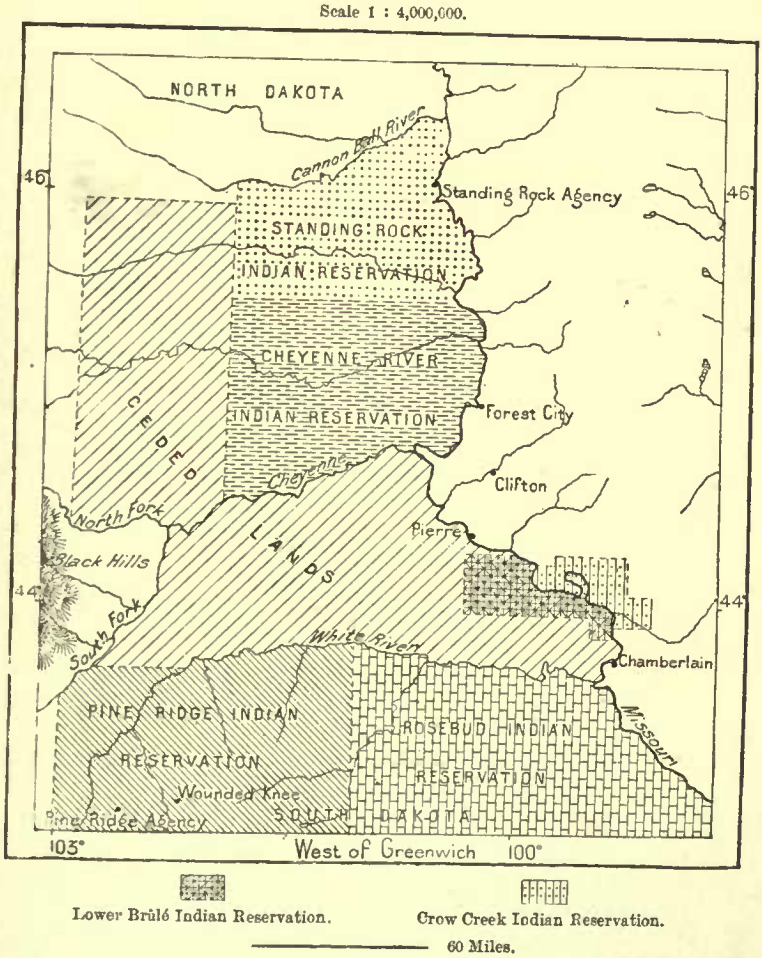
Indians, all being merged in the great ocean of American citizenship. In this way the Dakotas recently lost about two-fifths of their domain at a single stroke. Their threatened revolt was stayed in North Dakota by the arrest of their famous chief, Sitting Bull, who was killed in the ensuing scuffle, and in South Dakota by an accidental massacre of unarmed men, women and children. Other reserves are similarly disappearing in the old Indian Territory itself, where the new Territory of Oklahoma has already been organised by the whites, and is now claiming admission as a sovereign state into the Union.

In 1790 the first census of the new republic returned the negroes, or people of colour, as they prefer to be called, at over 757,000, of whom nearly 60,000 were freedmen; this gave a proportion of 19·3 per cent. for the African element, which is higher than at any subsequent period, although slaves continued to be

imported down to the year 1808. Even after the official suppression of the slave trade thousands were still introduced, especially into Alabama; but this contraband traffic had but a slight relative importance, immeasurably outweighed by the ever-increasing tide of white immigration. On the eve of the Civil War the proportion had fallen to 14·1 per cent., or less than one in seven, and in 1890 it again fell to less than one in eight. In the "black zone" the increase is exclusively by excess of births, all importation having completely ceased. Infant mortality is

Fig. 215.—Sioux Reserves.

Scale 1 : 4,000,000.



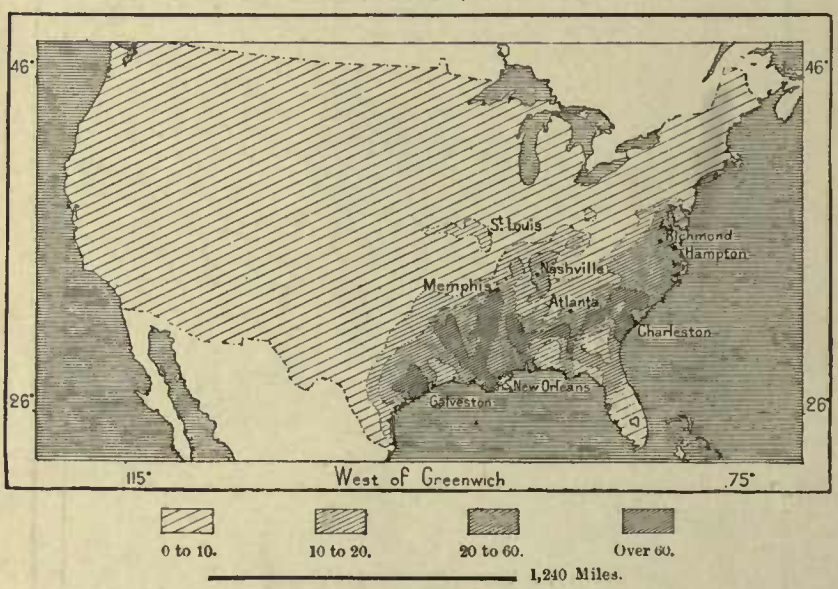
much higher, but the birth-rate is also proportionately still greater than amongst the whites, so that one more than balances the other, and the blacks would thus increase more rapidly than the whites but for the immigration of Europeans and of Northerners into the Southern States. During the decade ending 1890 the Afro-Americans diminished in none of the states; but the increase was nowhere great, except in the Southern States, in Arkansas and Oklahoma.

Since the emancipation the negroes are legally regarded as the equals of the whites. But although they enjoy the right of suffrage, and are in a numerical

majority in the three Southern States of South Carolina, Mississippi, and Louisiana, they nowhere enjoy social equality. North of Mason and Dixon's line they freely enter the public conveyances, but keep to their own churches and schools, and do not venture into the society of their white neighbours. In Texas, Georgia, and South Carolina they are practically deprived of the franchise itself, and they are unable to control the elections even in those states where they are numerically predominant. As a remedy for the evils caused by racial hatred, some statesmen have proposed a universal exodus, and Brazil, Cuba, Haiti, Central America, and especially Africa, have been successively proclaimed the future "earthly paradise" of the expatriated negroes. But such a project is naturally surrounded by formidable difficulties, not the least of which is the fact that their very labour renders the blacks indispensable to the white populations. They

Fig 216.—Black Zone in the United States.

Scale 1 : 50,000,000.



have also made some progress in a moral sense; education is spreading, and in 1890 nearly 20,000 primary schools, with 24,000 teachers, were attended by 1,378,000 negro children in the Southern States.

Land Tenure and Agriculture.

The extent of arable lands is out of all proportion to the wants of the people, and this very superabundance leads to reckless waste. The several states, formerly owners of vast spaces, have retained only some marshy or unproductive tracts. The Federal Government also, which still possesses a considerable extent of forests, mountains, plains, and deserts, representing altogether about 750,000,000 acres, has long parted with the best of the National Domain to settlers, war pensioners, and especially railway companies. In virtue of the "Homesteads" Law, every American citizen, if married or over twenty-one years of age, may demand a grant of 160 acres, of which he becomes absolute owner in a period of five years. But

available lands have become so rare that practically they can now be scarcely obtained except by competition in accordance with the usual laws of demand and supply. But the facilities of land transfer and of communications are now so great that at times whole communities are rapidly organised, and enter without delay on their new settlements.

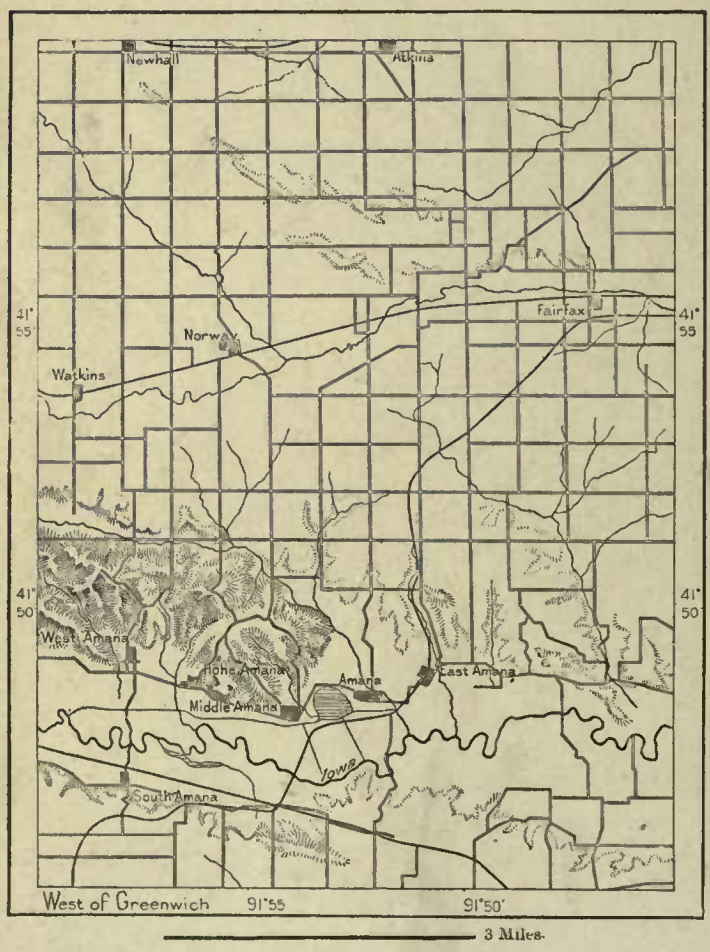
In the United States, public land surveys have preceded occupation ; hence, in level tracts, the surface is usually found to be already laid out with the monotonous regularity of a chess-board. The rural districts are all divided into townships

Fig. 217.—House of Negro Family in Florida.

six miles square, and subdivided into lots of a square mile, which are again disposed in four parcels of 160 acres each, and these are the plots which are granted or sold to applicants. All these quadrangular spaces are arranged with geometrical uniformity, each side facing a cardinal point. The purchasers rarely depart from this symmetrical system, opening their roads, building their houses, and sowing their fields all in the direction of the meridian or of the parallels of latitude. These regular farms also contrast with those of Europe in the greater space assigned to the several crops. On the plains of the Mississippi slope it is no

rare sight to meet with many thousand acres under maize or wheat, interrupted by no fallow or meadow lands. Such wearisome uniformity, however, is naturally far less prevalent on the more broken and longer-settled Atlantic seaboard, and especially in New England. The growth of the population also has, on the whole, tended to reduce the size of the farms, which have fallen from an average of 280 acres in 1850 to 125 in 1890, and of this space not more than about one-half is usually under cultivation. The great extent of these holdings explains the paramount importance taken by machinery and other time-saving agricultural processes, in which respect the United States unquestionably holds the first place in the whole world. The national wealth represented by such plant on the American farmsteads is estimated at about $600,000,000, and to the American inventive faculty the world is indebted for the first steam reaping and threshing machines, and a number of other ingenious appliances dispensing with much human and animal labour. Such is the extent of fertile land under tillage, and so favourable is the climate that, with comparatively little systematic manuring and artificial irrigation, the agricultural produce is yielded not merely in abundance but in a superabundance which at times is ruinous to the farmers. In the year 1883 the farmers of the trans-Mississippi regions harvested such quantities of maize that in many places they scarcely took the trouble to garner it, or else used it for fuel and fodder, or sold it at ridiculous prices. Thus this over-production tends to unduly lower market prices, and to depreciate the land itself. Hence mortgages have increased to an alarming extent, and many farmsteads have been left on the hands of the money-lenders. Thousands of plantations also in the

Fig. 218.—Townships in Iowa.
Scale 1 : 250 000.



Southern States have been broken up into small holdings, leased to the negroes and others too poor to purchase. Altogether about one-fourth of the land under tillage is thus already held by tenants, and the evil increases from decade to decade owing to the high rates of transport, for the farmers are practically powerless against the monopoly of the railway companies. Even the powerful association of the *Grangers*, founded in 1867, and in 1874 numbering over 1,300,000 members, failed to break down this monopoly, which is backed up by the great capitalists, and by the legislative force supplied by Congress. The small holders are also threatened by the great syndicates which have been created largely by British capital, and which have introduced the system of *bonanza farms*, so called from the bonanzas or pockets representing vast fortunes in the mines of the precious metals. The new domains, bought up by a few capitalists in London and some other large cities, often comprise vast areas larger than many of the prin-

Fig. 219.—Harvesting Wheat in the West.

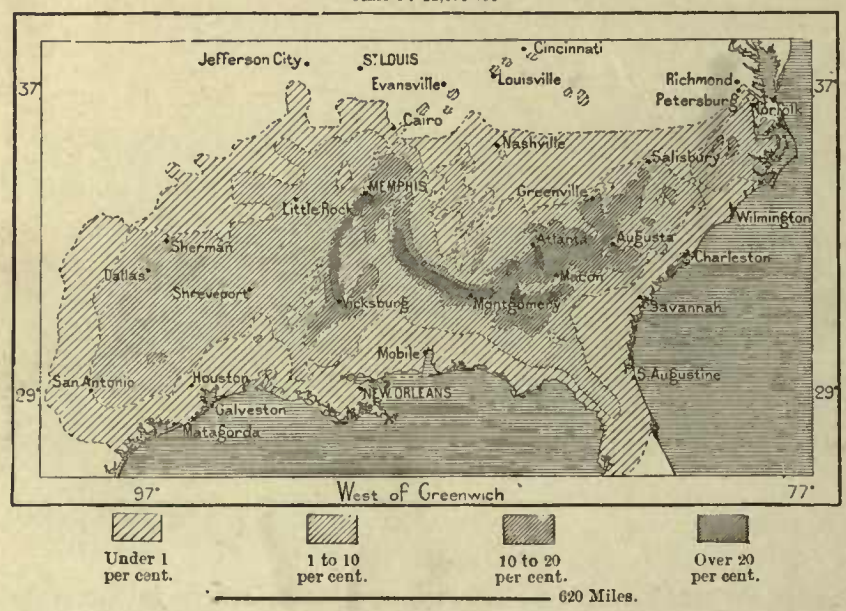
cipalities of the old Germanic Confederation. Certain estates in Texas have an extent of over 2,500,000 acres; a Californian banker has reclaimed 500 square miles by artificial irrigation, and a model farm of 75,000 acres in Minnesota employs 200 reaping-machines and threshing-machines, which daily turn out 75 waggon-loads of cereals.

Apart from China and India, the United States take the first rank for agricultural produce, and especially for cereals. Maize, or Indian corn, the American "corn" in a pre-eminent sense, covered one-half of all the land under cereals in 1889, and the yield represented three-fourths of that of the whole world. The old prairies of the Central States are now one vast field of maize, which here shoots up to an occasional height of 15 or 16 feet. But for the export trade maize is of less importance than the wheat crop, which is surpassed by that of Russia alone, and which in years of scarcity elsewhere is exported to the value of $200,000,000. Of other cereals, such as oats, barley, rye, buck-

wheat, rice, and sorghum (recently introduced for the manufacture of sugar), the most important are oats, which in 1889 yielded 725,000,000 bushels. Cane sugar, raised chiefly in the Mississippi delta, Texas, and Florida, has fallen off since the plantation days, though 250,000 tons, or one-sixth of the total consumption, were produced in 1890. The sugar extracted from the maple in the north, and elsewhere from sorghum and beet, is of slight economic value. But on the other hand viticulture is rapidly spreading, especially since the indigenous stock has been substituted for the vines introduced from Europe. The *soco* of Louisiana, better known in the north by the name of *scuppernong*, is the most common wild variety, and yields extraordinary crops both in marshy lands and on the slopes of the hills. In 1890 the vintage exceeded 25,000,000 gallons, besides 267,000 tons of grapes for the table; half of the whole crop is grown in California, New York and Ohio ranking next in importance. Fruits, such as pears, peaches, apples,

Fig. 220.—Cotton Crop of the United States in 1880.

Scale 1 : 22,000 000.



and berries of all sorts, are raised in prodigious quantities, especially in the Chesapeake peninsula, in California, Ohio, Indiana, Illinois, and the north-east Atlantic States. Fruits are more largely consumed than in any other country.

Before the War of Independence tobacco was the staple export of the British North American colonies; at present Kentucky, Maryland and Virginia are the chief producers, especially of the medium qualities. None of the varieties have the aroma of those grown in the West Indies and Philippine Islands, and amongst articles of export the foremost place is now taken by "King Cotton," for which before the Civil War the United States enjoyed almost the commercial monopoly. Most political economists supposed that the abolition of slavery and the stimulus given to cotton-growing in the competing countries, India and Egypt, would permanently deprive the Union of its pre-eminence in this respect. But America rapidly recovered its lost ground, and the cotton raised in the Southern States by

COWBOYS.

free white and black labour already supplies the whole of the New World with four-fifths and Europe with two-thirds of the fibre employed in the manufacture of their textiles. Over two-fifths of the total exportation consists in this product, amounting in 1888 to 4,650,000 bales, or more than double that of 1866, much of which represented the successive crops accumulated during the Civil War. Yet even cotton is surpassed by the yield of hay from about 33,000,000 acres under grass, with a production of 50,000,000 tons, valued at $400,000,000.

Forestry.—Stock-breeding.—The Fisheries.

The development of agriculture has been made at the expense of the timber in all forest countries, and Maine, which formerly yielded large quantities, has now little left except thickets of saplings and undergrowths. The *Pinus strobus*, most valuable of all trees, has almost disappeared, and now the ravages of the woodman have extended to Michigan, Wisconsin and Minnesota, the chief sources of supply for all the Central States. On the Pacific slope the process of destruction goes on in the same reckless way, not even sparing the giant conifers, which ought to be respected as natural marvels. The inevitable results are already seen in the deterioration of the climate in many regions, in the more prolonged droughts, and more sudden and disastrous freshets. But most of the states are now creating forest reserves about the headwaters of the streams in order to regulate their discharge and preserve the beauty of the landscape.

As for husbandry, the United States take also the foremost rank for stock-breeding amongst countries of European civilisation. Judging from the incomplete returns, horses, asses and mules cannot number less than 20,000,000, and there appears to have been a great increase during the last decade. Kentucky and Tennessee excel for quality, and the new "Kentocke" breed, a fusion of the New Mexican mustang, the Indian pony, and English thoroughbred, is noted for its strength, mettle, speed, and staying power. In 1892 the highest record for speed was broken by the famous trotter Nancy Hanks, who covered a mile in two minutes and four seconds. But cattle-breeding has acquired a far greater development, especially in the Atlantic States, in Ohio, Indiana, Illinois, and the other prairie states, which already possess about 15,000,000 milch cows of good stocks, yielding 500,000 tons of butter and 200,000 tons of excellent cheese, largely exported to England. On the trans-Mississippi plains and the Western plateaux, the cattle run half wild, and, like the bison that they have replaced, have little economic value. In these regions regular stock-breeding dates only from about 1875; about that time some English and other speculators rented vast tracts of many hundred thousand acres, where the cattle are left much to themselves, watched from a distance by the "cow-boys," a vigorous and daring race of men, skilled in the use of the lasso, in branding the herds, and driving them either to the watering-places or to the shambles. This industry has acquired an enormous development, and the "cattle-kings" now yearly consign millions to the meat-packing establishments of Chicago, Omaha, and Kansas City, besides exporting large numbers to England. Chicago is also the chief centre of the pork business, and here are packed over two-thirds of the 14,000,000 or

15,000,000 hogs yearly sent to the shambles. Mutton is less appreciated, and sheep are bred chiefly for their wool, which has greatly improved in texture in recent years. This industry is chiefly confined to the Pacific States.

The fishing industry, carried on especially in the New England waters and on the banks of Newfoundland, where the Americans have the right to fish within three knots of the coast, is necessarily subject to great vicissitudes. To the dangers of the sea is at times added the scarcity of fish, especially where the trawlers are provided with as many as six lines, each armed with a thousand baited hooks. Thus the New England fleet returned in 1890 with a miserable take of less than 80,000 barrels, representing not more than the twenty-fifth part of the harvest of 1884. Thanks to the systematic studies of the naturalists, American ichthyology has made considerable progress, and science has already recorded about 500 species of edible fresh and salt water fish, of which over a hundred have been recently discovered and classed. The varieties of salmon frequenting the Columbia and other rivers of Washington have been introduced into those of the Atlantic slope, while the lakes and streams have been stocked with new species from Europe and Asia. Oyster culture has also been greatly developed. Some formerly productive banks, such as those of Wellfleet on the Cape Cod peninsula, have been completely exhausted; but others, especially on the shores of Rhode Island and in Chesapeake Bay, are carefully administered, and yield prodigious returns, more, in fact, than all the rest of the world.

The Mining Industry.

The collective mineral wealth of the United States, comprising gold, silver, quicksilver, copper, lead, tin, coal, and mineral oils, exceeds that of all other countries. The most productive auriferous deposits are those of the Rocky Mountains and of the Sierra Nevada, where the great "mother lode," stretching parallel with the main axis of the range, gave to the name of California a sense somewhat analogous to that of "Eldorado," the "Pactolus," or "Golconda." The Spaniards had already worked a few places, digging along the river banks, and the discovery that caused the now historical rush was itself made in the fine gravels that had been deposited in the canals of a saw-mill near Sacramento. At first the gold-seekers moved along the water-courses which descend from the sierra, sifting the sands and gravels; but they soon found that the moraines skirting the river-banks also contained grains of gold, and these high bluffs were at once furiously attacked. Pick and shovel being too slow for the work, the very torrents and streams were diverted from their course, and utilised to carry off the refuse in a series of cascades; then the less compact walls of gravel were demolished by means of machines of the fire-engine type, so that the very physiognomy of the land was completely changed in some districts. But as the miners ascended higher and higher towards the primitive veins about the sources of the rivers, other more effective processes had to be applied to the destruction of the hard rock, and deep galleries and tunnels were excavated to reach the rich lodes and draw off the water from the works. These costly operations are not always remunerative, and the more accessible goldfields are already to a large extent

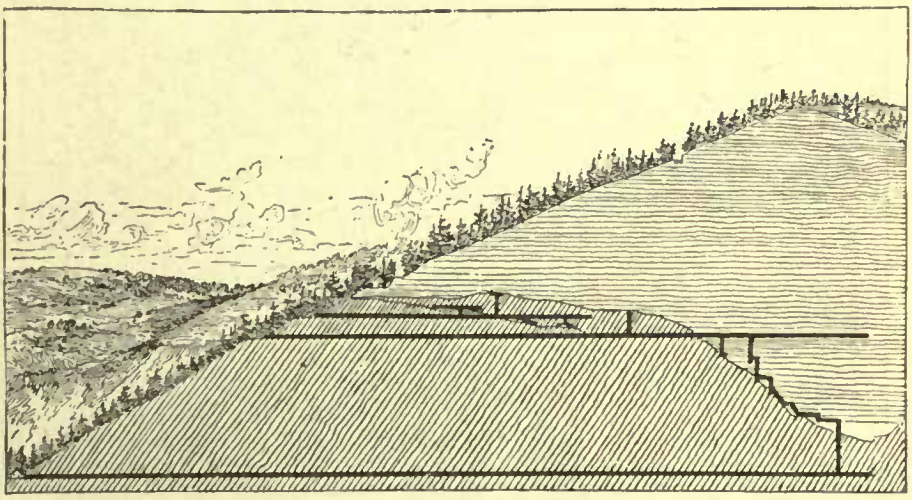
MINING BY THE HYDRAULIC PROCESS IN NORTH BLOOMFIELD, NEVADA.

exhausted, or else can no longer be worked profitably; hence the production has on the whole diminished in California since the middle of the century, having fallen from $81,300,000 in 1852 to a present average of from $15,000,000 to $20,000,000. The loss, however, has been partly balanced by discoveries in New Mexico, Arizona, Colorado, Montana, and Idaho. The total exceeds that of the Australian mean, and represents about one-third of the world's output.

California also holds the first place in the Union for its quicksilver-mines, though these are less important than those of Almaden in Spain, and also probably less productive than the ores of Kwei-Shau in Central China. Since 1850 the total production has exceeded 112,000,000 pounds, and more than a half of this metal comes from New Almaden, near San José in California.

The annual yield of silver has increased at a prodigious rate. Before 1860 it scarcely exceeded 16,800 pounds, representing about $300,000. But the discovery of the rich Washoe mines in the Sierra Nevada at once raised the production to

Fig. 221.—Mining Operations at Forest Hill, Sierra Nevada.



1,350,000 pounds, and since that time it has been almost quadrupled, at least in value, thanks to the inflated prices maintained in favour of the Federal mint. The commercial value of the metal, however, has fallen in the inverse ratio to its monetary value, which is raised by a third in consequence of the compulsory annual purchases which the Government is compelled to make by Congress. In 1891 the yield of the United States probably exceeded half of that of the whole world. The largest known silver deposit is the Comstock lode, on the east slope of the Sierra Nevada, which between 1859 and 1890 produced $332,000,000.

The United States also possesses apparently inexhaustible stores of copper, lead, zinc, manganese, nickel, cobalt, and iron. Tin occurs only in low grade ores in the Black Hills of South Dakota, in California, and some other districts. The copper mines had already been worked by the Indians before the arrival of the whites, and even before that of the Ojibways and Assiniboines, whom the French pioneers met on the shores of Lake Superior. At some points the works

had been carried to a depth of 50 feet in the solid rock. Tools of wrought copper belonging to these mines have been found in numerous mounds, and even the deposits of Isle Royale, so difficult of access in the stormy lake, show evidences of protracted mining operations. The copper ores of Lake Superior, extracted especially from the Keweenaw peninsula, are distinguished from all others for their almost absolute purity. A block of native copper weighing 500 tons has been found, which took no less than fifteen months to detach from the rock in which it was embedded, and one of the mines in this district is 1,480 feet deep. Yet they are exceeded in productiveness by the mines of Montana. Arizona also contributes to the yield, which is about two-fifths of that of the whole world.

The lead-mines, next to those of iron, have been longest worked, and their site already figures on the French maps dating from the middle of the last

Fig. 222.—Gold, Silver, Quicksilver, and Copper Mines of the United States.
Scale 1 : 45,000,000.

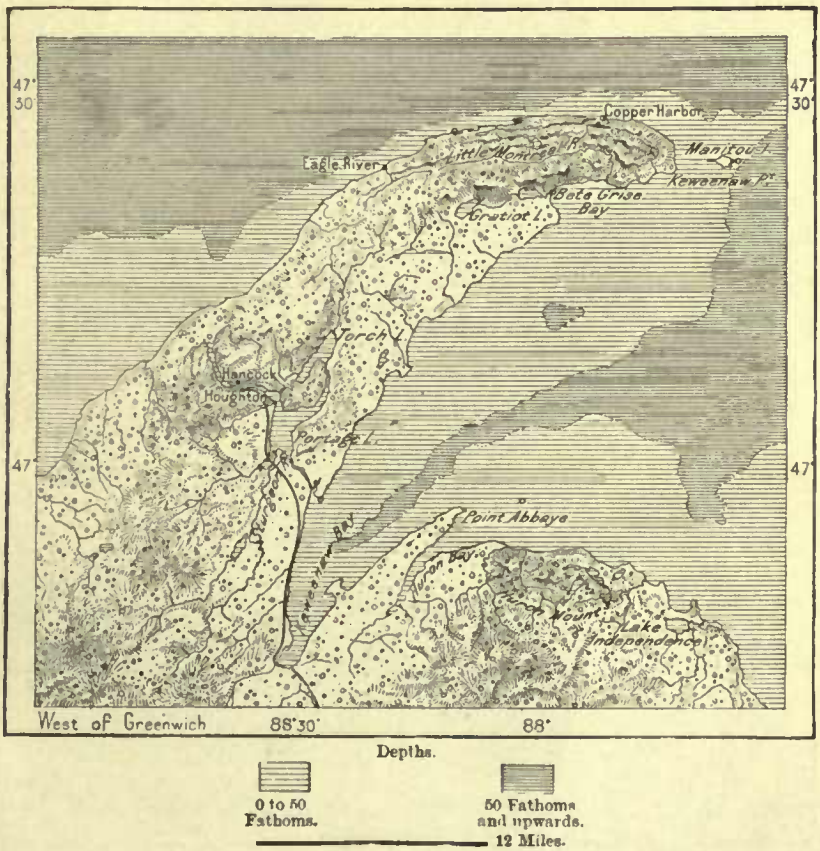
century. The deposits exploited at that period on both banks of the upper Mississippi are nearly exhausted, but extremely rich ores have been found, especially in South Missouri, where the lead is nearly always associated with zinc. Of the general production of lead and zinc the United States yield about a fourth and a sixth respectively. More than half of the iron annually mined in the Union comes from Michigan and Wisconsin, but owing to the high rates of transport, Pennsylvania imports over 1,000,000 tons from Cuba, Spain, Elba, and Algeria. America possesses an enormous reserve of coal, which, however, is extracted so recklessly that for every ton placed on the market two are wasted. Hence, political economists have already anticipated the possible exhaustion of the coalfields, although they are probably more extensive even than those of China, being estimated to occupy an area of about 200,000 square miles.

The first pit opened was that of Richmond, Virginia, which, like most of the

smaller basins in the chalk formations of the Atlantic slope, has been nearly exhausted. At present the anthracite, the bituminous and semi-bituminous coals are most actively worked, the output advancing from 60,000,000 tons in 1880 to 140,000,000 tons in 1889, representing at the pit's mouth a total value of $160,000,000. Pennsylvania alone produces more than half of this enormous quantity, although its preponderance is gradually diminishing in favour of the beds of the trans-Alleghany regions, and especially of Illinois and of Colorado, where anthracite is also found.

Petroleum is another source of great wealth to the United States. In 1627 the

Fig. 223.—Keweenaw Peninsula.
Scale 1 : 1,000,000.

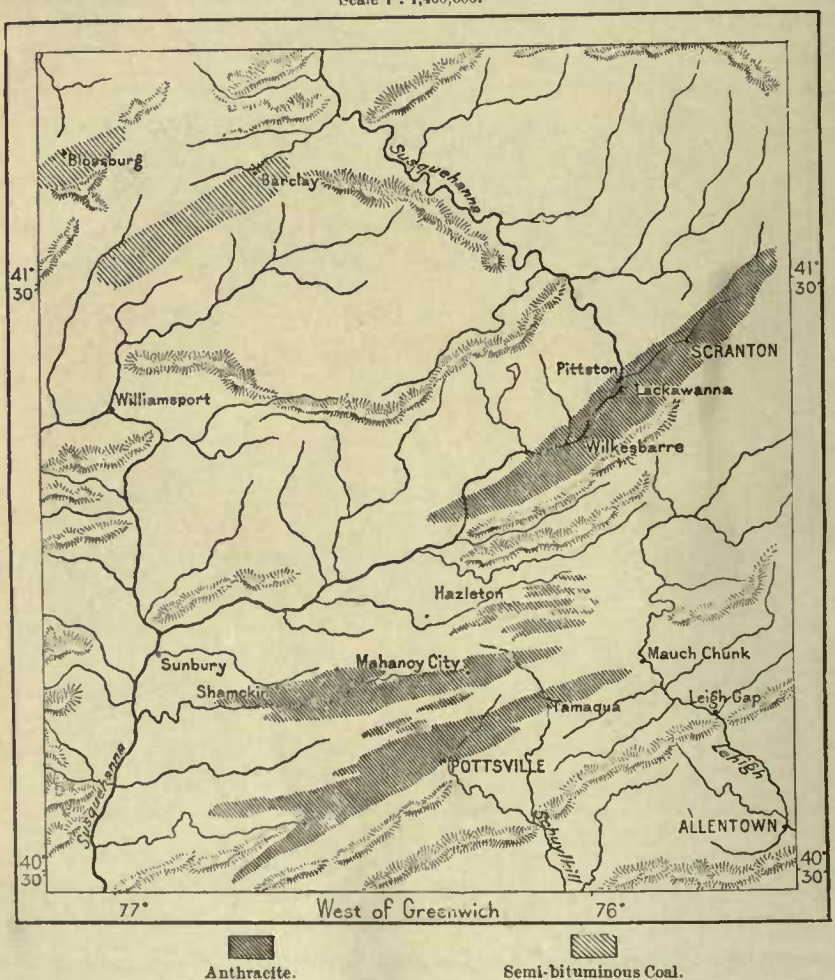


missionary Delaroche speaks of a "fontaine de bitume," which he saw south of Lake Ontario. The oil spring, from which Oil Creek in Pennsylvania takes its name, was well known to the Iroquois, who carefully husbanded the fluid, calling it the "great remedy." It was near Titusville, in the upper Oil Creek valley, that the first direct boring was made to tap the underground reservoir, which was found at a depth of about 70 feet, and which yielded a daily supply of 1,000 gallons. Such was the beginning of an industry which has since been developed with prodigious rapidity; wells were sunk in hundreds and thousands in the oil-bearing districts, and some of these yielded as much as 220,000 and even 260,000 gallons a day. Besides the Oil Creek valley, petroleum occurs on the banks of the upper Alleghany

in the south-west extremity of the state of New York, and in various parts of Pennsylvania; wells have also been found in nearly all the carboniferous regions of West Virginia, Ohio, Indiana, Kentucky, Colorado and California, and everywhere spring from sands contained in paleozoic (Silurian or Devonian) rocks. Their mean depth is about 1,000 feet, but it varies greatly, though no oil has been found so low as 500 feet below sea-level. Trans-Caucasia (the Baku peninsula) alone competes in this respect with the United States, which in 1889 produced

Fig. 224.—Anthracite Region in Pennsylvania.

Scale 1 : 1,400,000.



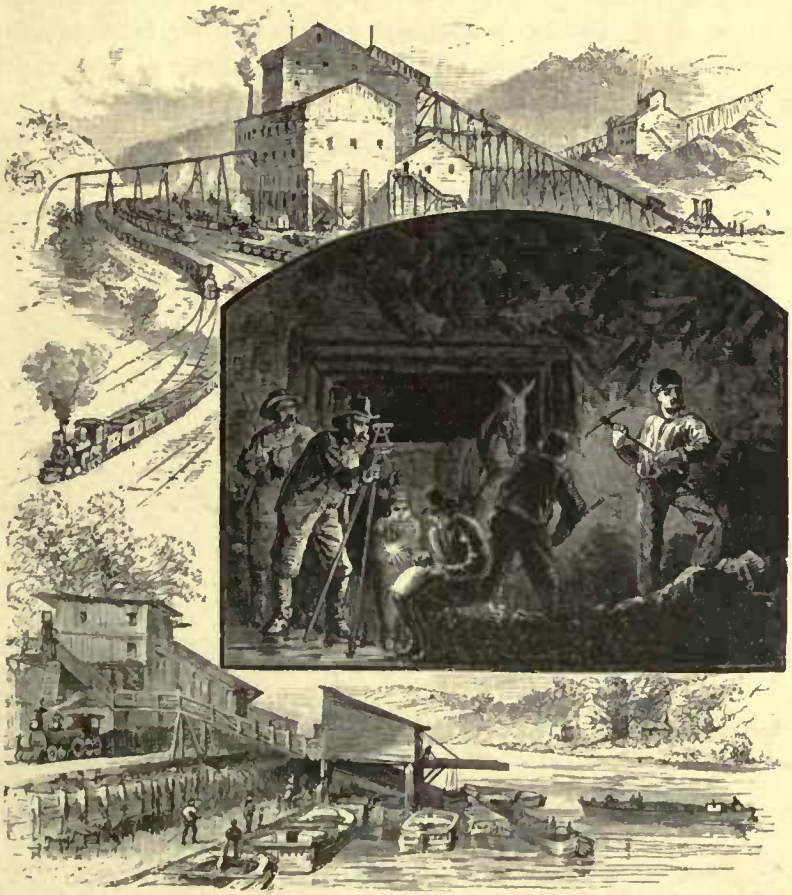
over 1,500,000,000 gallons, valued at $27,000,000. But the flow is diminishing, and the 60,000 wells now open yield less than the 40,000 of ten years ago.

Another source of wealth associated with petroleum is the natural gas, which was first used for lighting purposes at Fredonia, in the state of New York. In 1874 it was utilised in some metallurgic works in the Alleghany valley, and in 1877 a boring 1,320 feet deep, near Murraysville, east of Pittsburg, liberated a jet which flamed away uselessly for five years, but which has now partly or altogether displaced coal in the neighbouring factories. The composition of these hydro-

genated substances varies with the localities and even with the seasons, but they always burn with a bright, smokeless and scentless flame. The industry has been rapidly developed, the sale rising from $200,000 in 1882 to fifty times that amount in 1886. In Pittsburg alone the gas is used for heating and lighting in 470 workshops and 5,000 houses.

Including salt, gems, platinum, bauxites, phosphates, sulphur, borates, and

Fig. 225.- Coal Mining.



pyrites, granites, porphyries, marbles, sandstones, and other underground stores, the total annual mineral production is estimated by Day at over $656,000,000.

Manufactures.

Since the middle of the century almost every branch of manufacturing industry has been developed, and as a producer of manufactured goods the United States already competes with Great Britain, and even holds the foremost position for the number of steam-engines employed in factories and railways. In the production of pig-iron, iron, and steel wares the Union has outstripped not only Germany and France, but even England, although the centralisation of capital has been so rapid that the increase of productiveness has corresponded with a considerable decrease in the number of factories. Between 1880 and 1890 the yield of pig-iron was nearly trebled, while the blast furnaces were reduced from

681 to 562. Glass, paper, leatherwares, furniture, vehicles, sewing-machines, agricultural and other implements, all present the same remarkable phenomena of progress and rapid concentration. Syndicates are formed for grouping under a single administration a whole industry, or even several allied industries.

America is already independent of Great Britain for its cotton fabrics, about half of which are produced in Massachusetts and Rhode Island. Even the Southern States are beginning to share in this industry, and spinning-mills are springing up in proximity to the cotton plantations. So also metallurgic works have been opened in all the Central and Southern States, or wherever coal is found associated with good iron ores. Certain factories, such as the sewing-machine works of Elizabeth, near New York, and Pullman's railway rolling-stock works near Chicago, may be compared to large towns for population, extent and

Fig. 226.—Output of Coal in the United States.

Scale 1 : 45,000,000.

Tons per square mile.

0 to 1,000. 1,000 to 4,000. 4,000 and upwards.

Area of 3,8,0 square miles.

1,240 Miles.

productivity; on the other hand, certain cities, such as Pittsburg and neighbouring places, may be regarded as one vast workshop. The average rate of wages is higher than in England, although in many mining and metallurgic districts of Pennsylvania and the Ohio Basin the hands, mostly foreigners, accept payments that American artisans would refuse, and consequently live as precarious and wretched an existence as the Silesian weavers. Thus, despite local differences, the economic situation is much the same on both sides of the Atlantic, and the same antagonism prevails between capital and labour.

The total agricultural and industrial wealth of the republic represents a sum approximately estimated in 1890 at $62,610,000,000, or about $1,000 per head of the population. But this aggregate is very unequally distributed, and in 1890 more than half of the national wealth was in the hands of 25,000 capitalists.

TRADE—HIGHWAYS OF COMMUNICATION—NAVIGATION.

According to Edward Atkinson, the internal traffic exceeds the foreign twenty-fold, both collectively representing the prodigious sum of about $40,000,000,000. The republic, producing nearly everything necessary for sustenance, clothing and luxury, might reduce its imports to a minimum, and the recent fiscal arrangements have tended in this direction with a view to protecting the native manufactures against foreign competition. But despite the high tariffs, the movement of the exchanges is second in importance to that of Great Britain, amounting in 1890 to $1,750,000,000, inclusive of $103,000,000 transit charges, but exclusive of the precious metals. Thus, since 1790 the foreign trade has increased eightyfold, while the growth of population has only been at the rate of 1 to 16.

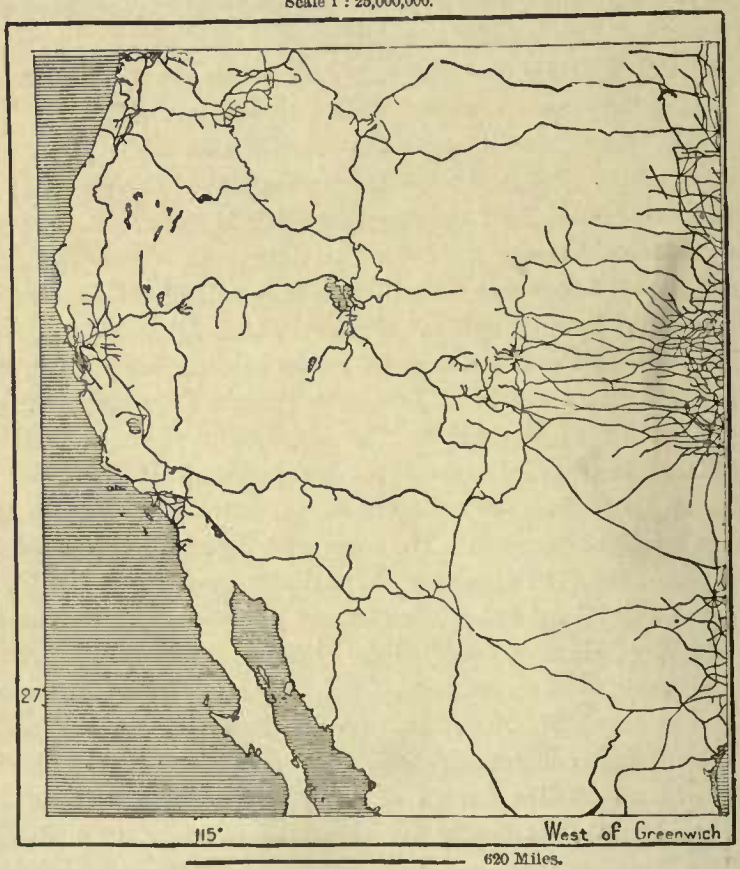
Great Britain still remains the best customer of the United States. Both countries having the same language, common traditions, and to a great extent a common origin, they naturally gravitate towards each other in all social and commercial relations. England takes the greater part of the excess of the agricultural produce—cereals, flour and cotton, sending in return manufactured goods, and almost monopolising the sea-borne carrying trade. Including the British colonies in the West Indies and Canada, more than half of all the exchanges are made with lands of English speech. France, which formerly took the second place, also imports cereals and cotton, in return sending her silks, manufactures and works of art. Mexico and the Dominion increase their commercial relations with the growth of the population and the development of the frontier railways. Cuba may almost be regarded as an economic dependency of the great republic, which, however, apart from the coffees of Brazil, does a smaller trade with South America than might be supposed. The trade with Asia is also less developed than might be expected from the proximity of San Francisco to Japan and China.

The traffic on the Great Lakes has attained prodigious proportions since the time when Cavelier de la Salle launched the *Griffin* on the Niagara River. In 1889 the merchandise conveyed on the Detroit River, between Lakes Huron and Erie, was estimated at nearly 27,500,000 tons for the American ports alone. In the same year the constantly increasing mercantile navy of the lakes comprised over 2,200 ships, with a collective burden of 826,000 tons. The river navigation is even more considerable than that of the lakes; but it represents a smaller value, being chiefly engaged in the carriage of coal, salt, and other bulky but less costly commodities. In fact, as commercial highways, the rivers are being steadily replaced by the railways, for the conveyance of passengers and merchandise of value. Yet they have been largely supplemented by navigable canals, which have a total length of over 3,000 miles, and which serve to forward from 25,000,000 to 30,000,000 tons of goods. Of these the most important is the Erie Canal, which cost $45,000,000, and has a length of 350 miles besides several branches; in 1886 its navigation exceeded 5,250,000 tons, valued at $180,000,000.

In 1827 was opened the first tramway, which ran from a granite quarry in Massachusetts to the port of Quincy south-east of Boston; but the first railroad traversed by locomotives, the Albany-Schenectady line, 16 miles long, connecting the Hudson and Mohawk Rivers, dates only from 1831. Ten years later the

collective length of all the lines already exceeded 3,000 miles, and since that epoch the increase, except during the Civil War, has been at an accelerated rate. Scarcely a year passes without an addition of at least 6,000 miles to the system, which already represents a capital of over $11,000,000,000, and employs as many as 700,000 hands. At present the total length of rails exceeds that of all Europe, and including that of South America the mileage is greater than that of all the rest of the world. This vast expansion, stimulated by the absence of good roads, and by the necessity of rapid communication between regions of enormous

Fig. 227.—Network of Railways in the West of the United States, 1889.
Scale 1 : 25,000,000.



extent, was also favoured by the general relief of the land, low-lying on the Atlantic seaboard, with convenient gaps leading through the Appalachian ranges to the boundless level or slightly rolling plains of the Mississippi basin. No great difficulties were met till the Rockies and the elevated Western plateaux were reached; but by that time capital had been accumulated sufficient for any practical undertaking, and the urgent necessity of connecting the Atlantic and Pacific emporia of New York and San Francisco soon enabled the great companies to overcome these obstacles. The two transcontinental lines, begun in 1865, were completed in four years, and since then several others have been added to their number. These lines traversing about 54° of longitude, or nearly a sixth of the circumference of the globe, the question of time acquired a

capital importance. In order to avoid the confusion caused by the different horaries, the companies have agreed to divide the continent into sections of 15 degrees, in each of which the hour is unified. Thus are arranged the five zones of *Intercolonial Time*, *Eastern Time*, *Central Time*, *Mountain Time*, and *Pacific Time*, and special conventions between the companies and the large cities determine the stations where the transition takes place from one hour to the other.

Such importance was attached to the completion of the transcontinental lines that public opinion was unable to resist the demands made by the companies

Fig. 228.—Network of Railways in the East of the United States, 1889.
Scale 1 : 25,000,000.

for assistance; they not only received concessions of vast stretches of the National Domain, but were also aided by grants of money, and the precedent once established, it was afterwards difficult to depart from it. Vast sums have thus been paid to the railway people, who have also received millions of acres of land along both sides of the trunk lines. By a skilful administration of these domains, the great companies have been placed in a position to acquire the control of the whole territory of which they hold the vital artery, and despite the resistance of those interested in opposing it, this control has become in many districts an accomplished fact. By analogous processes the National Parks, which cannot legally be sold in small allotments, have in reality become great hunting reserves for the directors

of financial companies, owners of the hotels, and of the railways giving access to these districts. Each of the huge caravansaries, such as that established near the Mammoth Terraces in the Yellowstone National Park, is in fact the centre of a real principality.

The North Americans are not "sea rovers" like their English cousins and the Norwegians. This is at first all the more surprising that down to the middle of the century the national flag covered three-fourths of their foreign trade. The first colonists, having settled for the most part close to the sea, lived partly on the produce of the fisheries, which were very productive in those waters. They had also the advantage of excellent timber for their commercial fleets, which were surpassed by those of England alone. But a great revolution to their disadvantage was caused by the introduction of steam, and the gradual substitution of iron for wood in shipbuilding. Then came the Civil War, which at a stroke

Fig. 229.—Time Zones in the United States.
Scale 1 : 60,000,000.

reduced their mercantile navy by a third, and, the same economic laws still prevailing, the decrease has gone on from year to year. At present about 14,000,000 of the 18,000,000 tons representing the foreign trade are carried by foreign flags.

After Fulton's experiments on the Hudson in 1807, steam navigation first acquired an industrial character, and the first steamer to cross the Atlantic was the *Savannah*, which, sailing from the city of the same name in 1819, reached Liverpool in 25 days. The United States thus took the initiative in trans-Atlantic steam navigation; which, however, first assumed a practical form in 1838, when the *Sirius* and the *Great Western*, one sailing from London and the other from Bristol, steamed into New York harbour within a few hours of each other, the *Great Western* having made the voyage in 14½ days. Two years later was founded the Cunard line, which has remained the most important of all those now plying between Europe and the United States. In 1891 there were no less than twelve trans-Atlantic companies, with a total of 84 boats, maintaining a regular weekly

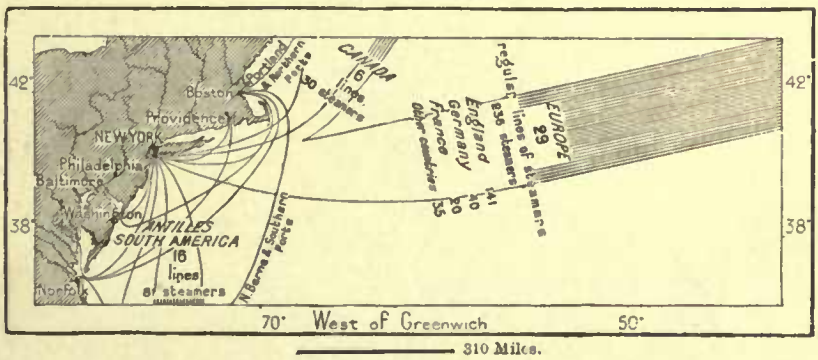
service between New York and several European ports, besides nine other lines carrying passengers at longer or irregular intervals. The boats of the chief lines vie with each other in speed, and like horses on the racecourse, these "ocean greyhounds" are often heavily backed one against another. The mean time of passage from Queenstown to Sandy Hook is several hours less than six days, and has been reduced by two days during the last fifteen years. Since 1851 the fastest passages of sailing vessels have been made by American ships.

Public Instruction.—Religion.

The first schools founded by the early settlers combined religious with secular instruction. But in course of time a divorce took place; the religious establishments became private institutions, and the state acquired an indirect preponderance in the public schools and colleges. The grants made by the state legislatures and by Congress constitute in fact a budget of public instruction differing from those of Europe only in their administration. In 1785 it was decided that every sixteenth section in freshly surveyed lands should be set apart for the public schools.

Fig. 230.—Regular Lines of Steamers converging on New York, 1891.

Scale 1 : 23,000,000.



Each state received into the Union became *ipso facto* owner of extensive territorial property, the sale of which had to be applied to educational purposes. Additional funds were voted by Congress from time to time, and in 1888 the assignments of land had increased to a total of 77,000,000 acres. The sale of these lands, however, yields not more than about one-fifth of the total revenue, and the direct taxes annually voted by the several states exceed $100,000,000.

The principle of free and obligatory education, originally adopted in Massachusetts, now prevails throughout most of the Union, though its practical application meets with many difficulties, and there are still hundreds of thousands of untaught children, not only amongst the foreign immigrants but also amongst the native Americans themselves. The returns for 1890, however, show that the attendance is increasing in all the states except Maine, Vermont and New Hampshire. Private adventure schools are perfectly free and exempt from the control of the law, which requires only that English be taught. The public schools, being conducted without any sectarian spirit, are generally looked on with disfavour by the Roman Catholics, the Episcopalians and Lutherans, and in 1889 the Catholics possessed about 3,000 private establishments in which their religion was taught.

Above the primary schools follow the secondary and higher schools of all sorts, colleges, institutes, academies, normal and technical schools, universities, founded either by the states, the religious bodies, or private munificence. The Federal Government itself has no schools, except the special military and naval establishments of West Point on the Hudson, Annapolis on the Chesapeake, Leavenworth in Kansas, and New Haven. Nor does the state confer diplomas, so that the value of these certificates differs greatly according to the efficiency of the universities and other teaching corporations by which they are granted. The right of women to full instruction is generally admitted in principle, and numerous schools, colleges and universities are already open without distinction to students of both sexes. On the other hand 200 colleges reserved for girls are attended by about 25,000 students, and real universities, such as Vassar College at Poughkeepsie, have even been founded for them.

Fig. 231.—Chief Universities and Colleges in the United States.

Scale 1 : 45,000 000.

The older universities were originally religious establishments, which became gradually transformed to secular institutions. The modern universities, also founded by the states, the churches, or opulent citizens, aim chiefly at a scientific education. They are very numerous, but perhaps not more than fifteen contribute much to the advancement of knowledge. Moreover, the principle of "university extension," as it is called, is gaining ground, its object being to enable all citizens to share in the progress of science by association with the local universities, by attendance at the professional lectures and even at a regular course of studies, by the establishment of free libraries in every village, by systematic visits to the museums, and laboratories, and by utilising the long summer vacations for collective studies conducted by the university staff, so to say, *al fresco*.

Although America is too young to have yet produced an Æschylus, a Shakespeare, a Newton, a Laplace or a Helmholtz, she has already taken a worthy

share in the progress of science, the arts and letters, as evidenced by such names as Emerson, Thoreau, Hawthorne, Longfellow, Lowell, Maury, Edison, Dana and many others. Of the 5,000 or 6,000 works yearly issued by American publishers several form valuable additions to the sum of human knowledge, and few places can compare with New York and Boston for the excellence of their scientific and literary serials.

According to the Federal Constitution the Church is completely separated from the state, and Congress abstains from all interference in religious matters. The local constitutions also have successively adopted the principle of universal religious equality, though traces still survive here and there of the old intolerant spirit. Regular subsidies are even voted to various religious bodies or at least to charitable and educational institutions controlled by the clergy, while ecclesiastical buildings are exempt from taxation in most of the states. The various legislatures, as well as both Houses of Congress, have their chaplains, the sessions begin with an official prayer, days of public fasting and penitence are solemnly proclaimed, in a word the American Government may be described as "Christian" without special qualification, its protection extending equally to all forms of worship from the Catholic to the Adventist and Unitarian. Certain writers have spoken with alarm or with enthusiasm of the progress of the Catholic Church. But this progress is due entirely to immigration, especially Irish, German, and Latin. This element probably forms one-third of the whole population, but the proportion of Catholics, numbering at present over 6,000,000, is less than a tenth; hence they have really lost much ground. The proselytising spirit is felt far more acutely in the North than in the South. Thus it happens that, while many of the aborigines settled about the Great Lakes and beyond the Mississippi call themselves Roman Catholics, the Southern negroes still remain Baptists and Methodists as in the plantation days. Many even of the Louisiana "Creoles" have adopted these forms of Protestantism, as if they hoped by the change of worship to place themselves on a level with their liberators.

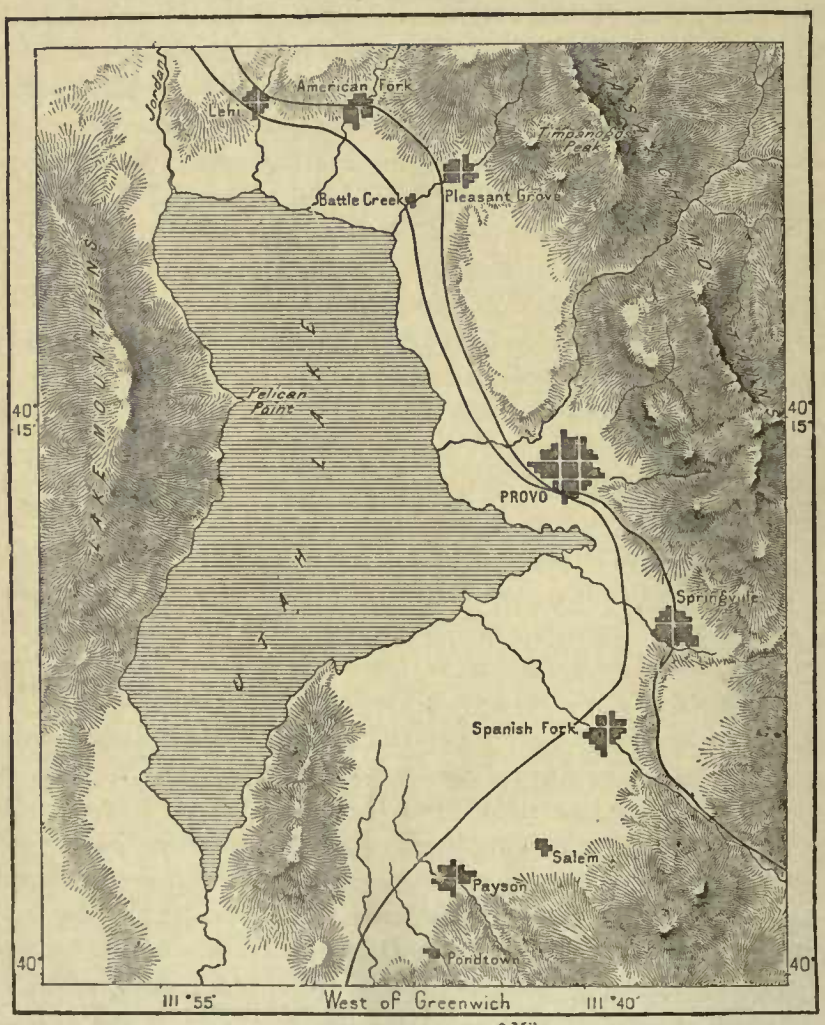
On the other hand, the formerly powerful Congregationalist body, which comprised the Puritans of New England, has lost some of its authority, while its narrow dogmatism has become less rigid. The Congregationalists, properly so called, scarcely number more than 500,000, so that multitudes of the descendants of the old Puritans have separated from the parent stem and joined other sects, or developed new forms of belief. Of those offshoots, one of the most enlightened is that of the Unitarians, who, though relatively few in numbers, can boast of such luminaries as Channing, Theodore Parker, Emerson, and Frothingham. New England is still the stronghold both of the Congregationalists and Unitarians. Here are also the headquarters of the Presbyterians, while the Episcopalians, Methodists, and Baptists are more powerful in the South.

Besides the great divisions of the Christian world there exist, as in England, at least 150 other groups of a more or less fluctuating character. The Quakers, first settlers of Pennsylvania and New Jersey, are reduced to about 100,000. The Mormons, after severing themselves from all other connections, attempted to set up a distinct political state in the Far West, whither they migrated in 1847.

In their new homes on the shores of the Great Salt Lake the struggle with the "Gentiles" was resumed, and signalised by such horrors as the massacre of Mountain Meadow. The community of "Latter-Day Saints," as they call themselves, has by some writers been regarded as an outcome of American democracy; but it was, on the contrary, a reactionary movement, which aimed at establishing an infallible theocracy in a sect of Protestant origin. In 1890 the Mormons numbered over 144,000, forming 425 communities, chiefly in Utah. Before the sup-

Fig. 232.—Mormon Settlements, Utah Lake and Jordan Valley.

Scale 1 : 375,000.



pression of polygamy, interdicted by three successive Acts of Congress, over 1,300 "saints" had been imprisoned for the crime of bigamy. Many are now migrating to Mexico, where they have received large grants of land, with full permission to continue the practice of polygamy.

The so-called "camp meetings" are often referred to as proving the fanatical character of the religious sects in the United States. But these open-air gatherings, common enough in the rural districts on the banks of the Great Lakes and of the

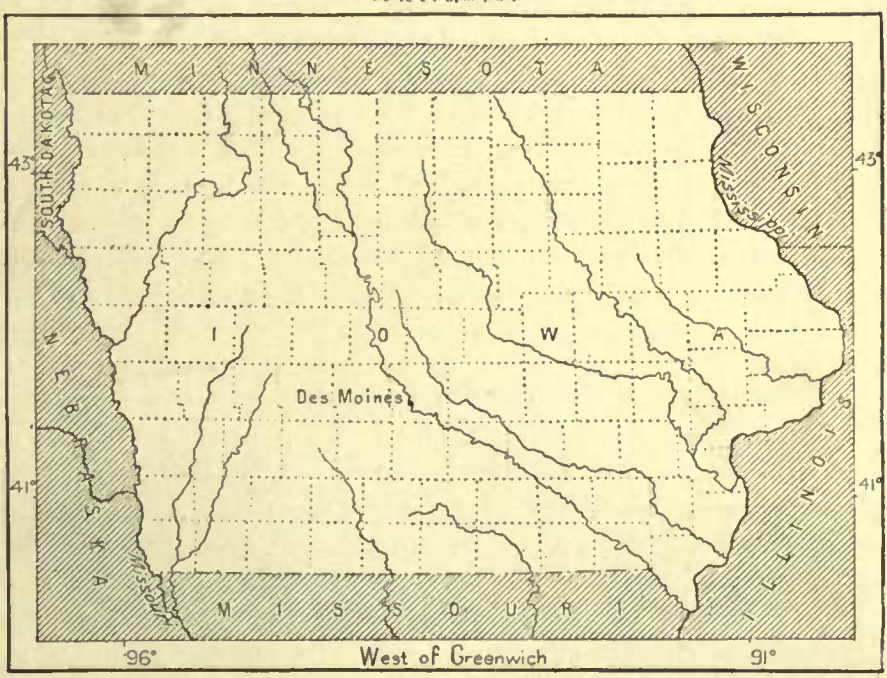
Ohio, have little resemblance to the popular descriptions. Impelled by the need of change and excitement ingrained in all Americans, and especially by the love of society, the farmers, living mostly in isolation, feel from time to time a yearning for a "revival," which is itself a relaxation from the routine of daily existence, and a stimulus for future work. Such meetings, usually held in the midst of charming scenery under blue skies and on the banks of sparkling streams, are really holidays combining pleasure with religion, and naturally take the form corresponding to the prevalent ideas.

Government and Administration.

The communal organisation varies greatly in the different states, and in New England alone the town retains its original character of a rural district

Fig. 233.—Division of Iowa into Counties.

Scale 1 : 5,500,000.



averaging from four to six square miles in extent, in which the settlers, scattered over the forest clearings, were still near enough for mutual help in case of danger. Round this municipal centre gravitated the whole existence, civil and religious, of the community. The nation itself has grown out of the union of all these self-governing towns, so that the American republic may be said to have already taken its rise in colonial times in the primitive communes of New England. The village electors are all by right members of the assembly, and generally meet three or four times during the year, either in the church or the school, or even in the open air, to discuss questions of general interest.

In New England the counties are simply groups of towns organised for the administration of justice and the construction of the main highways; but in the Central and Southern States the counties are the primary administrative divisions.

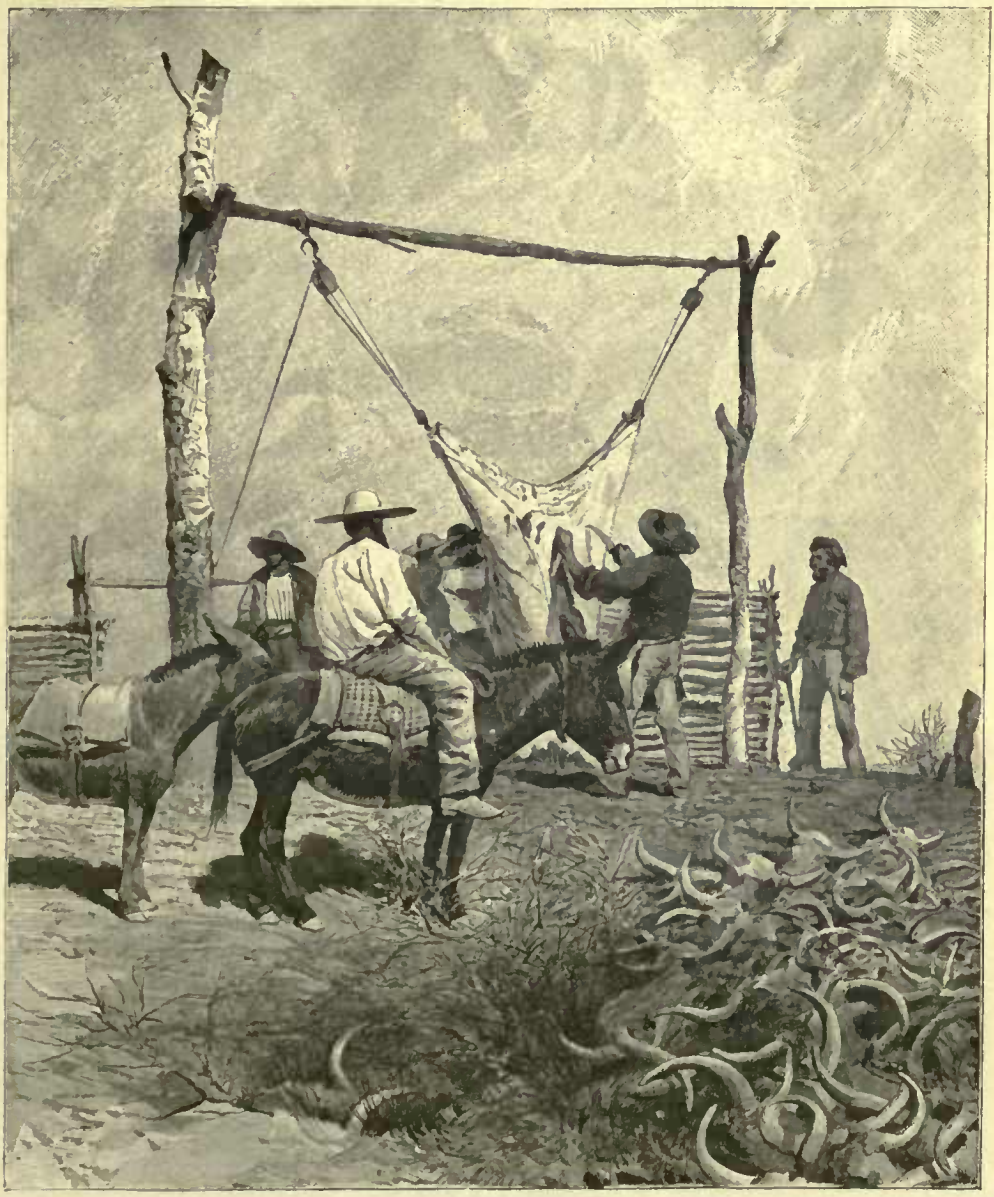
In the latter region the land was not distributed amongst numerous small farmers, but formed vast domains worked by slave labour on the plantation system. In the Central and Western States the rapid settlement of the country had analogous consequences. But the social transformations brought about in the South and West have had the result of gradually forming townships modelled on the towns of New England. Thus in the West the counties have been divided into townships, each forming a geometrical square six miles on all sides, and all disposed in regular series, so that on the plains and level plateaux the country presents the aspect of a chessboard, as shown in the county map of Iowa (p. 477). When the village is sufficiently developed it may claim the official title of "city," and it then receives a charter embodying the rights and conditions of its new organisation. Each city is administered by an elected mayor and legislature, mostly of two chambers, the municipal officers being also elected in some states, and directly appointed by the mayor in others.

Each of the states constitutes a sovereign community, with political rights antecedent to those of the Union itself. But since the last century the central government has been gradually strengthened at the expense of the local sovereignties. In case of conflict between the two, one result of the Civil War was to solve the problem in favour of the supreme authority. Hence the autonomy of the several states is now limited by the absolute obligation of remaining an integral part of the Union, and henceforth the abstract right of secession, if it ever existed, is completely abrogated. Certain public services, such as the post, the army and navy, the administration of the territories and of Indian affairs, are also centralised, and all questions as between the Union and the individual states must be referred to the Federal courts. The constitutions of the original states derive from royal charters, some of which were even textually preserved with a few addenda after the separation from Great Britain. Since then frequent revisions have been made, the people in such cases reserving the right of deliberation by special convention, whose decisions are finally submitted to a plebiscite. Since 1888 most of the states have modified the electoral laws on the Australian model, with a view to ensuring the secrecy of the voting and the representation of minorities. Universal suffrage exists in principle, although here and there limited by a few slight conditions, such as the power of reading the constitution in English, as in Massachusetts, which on the other hand extends the right of voting to women on educational questions. In Wyoming women are completely enfranchised, and even take their seats on the jury. All the states have an elected governor, and an upper and lower house elected for varying periods, the deputies receiving a small subsidy for their services. In the territories the people take no part in the legislative and presidential elections, and the executive is represented by a governor and other functionaries nominated by the president. Even the delegates to Congress, one for each territory, are barred from voting.

In its origin and legislative functions the Union presents the twofold character of a centralised state and of a league between sovereign communities. After the War of Independence each of the thirteen states resumed the independent administration of its affairs; the deliberations of Congress had little influence, and the

federal tie scarcely existed except in theory. But the necessity of a closer union soon became manifest, and the new constitution, carefully framed to secure absolute unity, while safeguarding the sovereign right of the several federated provinces, became law for the whole republic in 1789. But the question of slavery was waived, and was thus left to the decision of the sword seventy years later.

Fig. 234.—Shambles in Texas.



The lower House of Congress is elected by the American citizens, in proportion to their number in the several states, and as constituted in 1789 it comprised 65 members, or one for every 30,000 inhabitants. Since that time they have increased to 356, and would be even far more numerous had not the proportion of electors for each representative been raised from 30,000 to about 176,000

(1892). The members are chosen amongst the residents of the electoral districts, for a period of two years, and for these elections the suffrage is practically extended to all men over twenty-one years old; but soldiers, sailors, and officials are excluded from the representation, about three-fourths of which consist of lawyers. Both representatives and senators receive a yearly subsidy of $5,000, besides $125 for expenses and mileage, calculated at twenty cents the mile. Candidates for the Senate, who must be thirty years of age and residents in their respective states, are returned for six years, and are re-eligible any number of times. They are nominated, two for each state, by the local legislatures, and every two years a third of the members retire in rotation, having completed their term of office. The Senate is thus periodically renewed by election or re-election; but no one

Fig. 235.—Division of the United States into States and Territories.
Scale 1 : 45,000,000.

1. Maine.
2. New Hampshire.
3. Vermont.
4. Massachusetts.
5. Rhode Island.
6. Connecticut.
7. New York.
8. New Jersey.
9. Pennsylvania
10. Maryland.
11. Delaware.
12. District of Columbia.
13. Virginia.
14. North Carolina.
15. South Carolina
16. Georgia.
17. Florida.
18. West Virginia.
19. Kentucky.
20. Tennessee.
21. Alabama.
22. Mississippi.
23. Ohio.
24. Indiana.
25. Illinois.
26. Michigan.
27. Wisconsin.
28. Minnesota.
29. North Dakota.
30. South Dakota.
31. Iowa.
32. Nebraska.
33. Missouri.
34. Kansas.
35. Arkansas.
36. Louisiana.
37. Texas.
38. Indian Territory.
39. Oklahoma.
40. Montana.
41. Idaho.
42. Wyoming.
43. Colorado.
44. Utah.
45. New Mexico.
46. Arizona.
47. Nevada.
48. Washington.
49. Oregon.
50. California.

1,240 Miles.

state can ever elect its two senators simultaneously. It follows that if the balance of the two leading parties (Republicans and Democrats) has been shifted in the interval between two elections, the two senators find themselves in opposition, so that their votes are neutralised. As a legislative body, the Senate, of which the vice-president is *ex-officio* president, votes the laws by a simple majority if the President assents, and by a majority of two-thirds his veto may be overruled. As an executive body, the Senate confirms the presidential treaties and nominations; it also exercises judicial functions in the case of high officials incriminated by the House of Representatives. When the two chambers come into collision the Senate nearly always triumphs, being a smaller and consequently a better-disciplined body, and can also better afford to wait.

The legislators of 1787-89 fancied they had taken every precaution to protect the election of the President from party influences. But the electors themselves are nominated on the express condition of voting for such and such a candidate; hence practically the popular vote settles the question, the election is made on strictly party lines, and the suffrage of the electors is a mere matter of form. Consequently, all the efforts of the rival parties are aimed at securing the popular vote. Each state returns a ticket or list of as many electors as it has representatives in both houses, and these electors invariably vote for the candidate of their party. Thus in a state like New York a bare majority of a single vote might suffice to give a presidential candidate the electoral vote of that state, and thus outweigh the nearly unanimous suffrages of several less important states. In such cases, the majority of the popular suffrages being represented only by a minority of the electors in the second degree, the candidate really elected by the people is precisely the person excluded from the White House. An instance occurred in 1876, when the Democratic candidate, Tilden, had to yield to his Republican competitor, Hayes, who had nevertheless been outvoted by 250,000 in an electorate of 8,300,000 voters. But at certain critical moments party spirit grows to a fever heat akin to that of the passion of gambling.

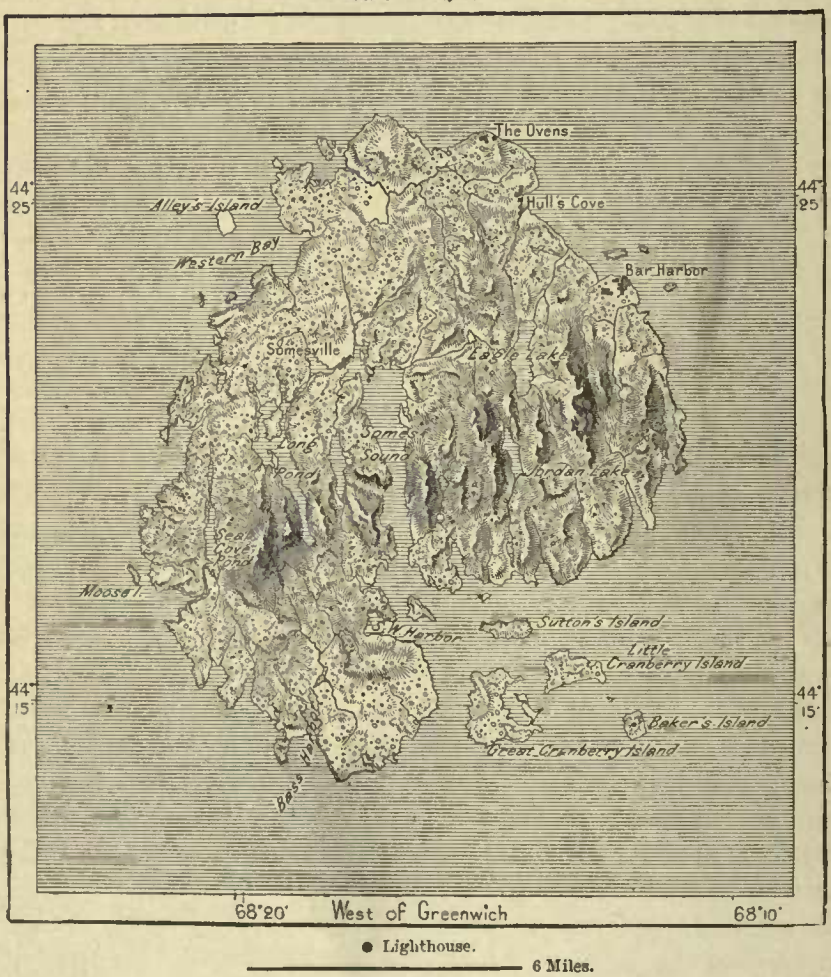
Hitherto the two great historical Republican and Democratic parties alone have been recognised, the former since the abolition of slavery advocating protection, reciprocity, bimetallism, and the Monroe Doctrine; the latter demanding free or fair trade, and generally upholding the principles formulated by Jefferson. To these must now be added two others, whose growing influence is beginning to be felt in controlling the presidential elections—the Prohibition Party, opposed to the liquor traffic, and favouring the extension of the franchise to women (National Convention, Cincinnati, June 30, 1892), and the People's Party, aiming at a better distribution of accumulated wealth by a graduated income tax, and generally by a legislation hostile to commercial rings and combinations, and to the privileges now enjoyed by railway companies and other great trading corporations (National Convention, Omaha, July 4, 1892).

Without possessing the name, the President enjoys far more power than the head of any constitutional monarchy in Europe. He commands the land and sea forces, signs treaties with the advice and consent of two-thirds of the Senate, appoints all ambassadors and consuls, as well as the justices of the Supreme Court and the other high state functionaries; also, with the consent of the Senate, disposes of a veritable army of petty officials, summons Congress in emergencies, and at the same time possesses the right of vetoing its resolutions, which in that case cannot take effect unless sanctioned by two-thirds of the suffrages in both houses. The heads of departments are named by the President with the almost enforced assent of the Senate, and are in no way responsible to Congress. In fact, they are entirely independent of that body, and look to the President alone, like the ministers of a Sultan or a Tsar. Hence the whole weight of responsibility rests on the Head of the State, who is answerable for the conduct of his subordinates, and may be impeached by Congress.

The Secretary of State is the first in rank and power of the eight secretaries,

or heads of departments, constituting the Cabinet. At times his influence is felt even more potently than that of the President himself. But the Cabinet lacks the unity of analogous bodies elsewhere; each of the secretaries treats directly with the President, who summons them collectively or individually at his pleasure. Cabinet meetings may also take place at the White House, or in any public bureau, or even outside Washington, as, for instance, in any of the so-called "summer capitals" of the republic. Hence, during the warm season, statesmen gravitate round the places resorted to by the President or his more

Fig. 236.—Mount Desert Island.
Scale 1 : 275,000.



influential ministers. Owing to this custom, Long Branch and Bar Harbor, in Mount Desert Island, have in recent years acquired immense importance as temporary centres of American politics.

The justice of the peace, elected in most of the states by popular suffrage, occupies the lowest place in the judicial hierarchy. His functions, stipend, and term of office vary in the different states, and in many places he takes cognisance only of civil matters. Above him are the local circuit and county courts, the courts of appeal, and the supreme courts of the several states.

These tribunals take different names, but all, except those of Louisiana, which retains the French code, are organised much in the same way on the methods of procedure introduced by the English jurisconsults. In most of the old states the judges are still appointed by the governor and legislature, but elsewhere they are elected by universal suffrage. Appeal is allowed from the lower Federal Courts to the Supreme Court of the United States, consisting of nine Federal justices appointed for life. In some of the Northern States, capital punishment has been abolished; but, on the other hand, "Lynch law" still prevails throughout the West and South.

Fig. 237.—Lifeboat Stations on the Massachusetts Coast.
Scale 1 : 15,000,000.

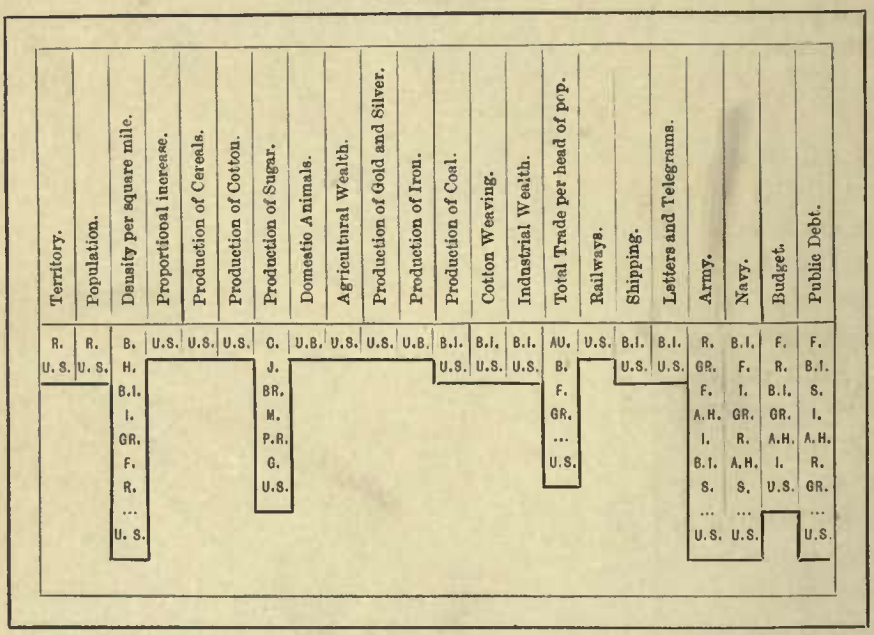
The United States can scarcely be said to have a standing army, this expression being scarcely applicable to a force of less than 30,000 men scattered over a territory nearly as large as all Europe. Nevertheless, certain strategic positions on the seaboard, such as the approaches to New York, are protected by strong defensive works. Important services have also been rendered by the military department, not only in connection with the Indian wars, and in suppressing brigandage and smuggling along the Mexican frontier, but also in carrying out such peaceful operations as the preliminary surveys for the transcontinental railways, and the construction of the levees on the banks of the Mississippi. The army is recruited by volunteers, white or black, between the

ages of 16 and 35, who engage for five years. Recently companies have been formed of the Redskins, who make excellent soldiers. There is a slow promotion from the ranks, but most of the officers are supplied from West Point.

The navy is relatively stronger than the army, being required for such services as oceanic exploration, diplomatic demonstrations, and similar work. Abundant means are supplied by the customs, a few internal taxes, and the sale of the public lands for works of a national character. The Government conducts the postal service at a slight loss to the Treasury. The telegraph system is entirely in private hands.

The country is still burdened with the debt contracted during the Civil War, the total cost of which has been officially estimated at $6,190,000,000. But

Fig. 238.—Comparative Table of the Material Condition of the United States and other Powers.



A.-H. Austria-Hungary. AU. Australia. B. Belgium. B.I. British Isles. BR. Brazil. C. Cuba. F. France. G. Guiana. Gr. Germany. H. Holland. I. Italy. J. Java. M. Mexico. P.-R. Puerto-Rico. R. Russia. S. Spain. U. S. United States.

to this must be added about $2,000,000,000 spent by the South. The national debt rose from $90,000,000 before to $2,773,000,000 after the war, involving an annual charge of $150,000,000. The debt has been reduced by two-thirds (1891), while the conversions at lower rates of interest have got rid of a fifth of the original charges. Thus the administration is troubled not by a deficit but by an excess of revenue. A numerous class of parasites live on the public funds, and the army with its pensions costs more than the vast military forces of France or Germany. Over 600,000 survivors of the Civil War are on the pension list, drawing on an average $120 a year, and this list has been recently increased. Including the states and territories, the counties, cities, and schools, the total indebtedness of the republic exceeds $2,000,000,000, corresponding to a charge of $32 a-head.

APPENDIX.

STATISTICS OF THE UNION.

AREAS AND POPULATIONS.

	Area in sq. miles.	Taxable Population, 1880.	Taxable Population, 1890.
North Atlantic States.			
Maine	33,040	648,936	661,086
New Hampshire	9,305	346,991	376,530
Vermont	9,565	332,286	332,422
Massachusetts	8,315	1,783,085	2,238,943
Rhode Island	1,250	276,531	345,506
Connecticut	4,990	622,700	746,258
New York	49,170	5,082,871	5,997,853
New Jersey	7,815	1,131,116	1,444,933
Pennsylvania	45,215	4,282,891	5,258,014
Total	168,665	14,507,407	17,401,545
South Atlantic States.			
Delaware	2,050	146,608	168,493
Maryland	12,210	934,943	1,042,390
District of Columbia	70	177,624	230,392
Virginia	42,450	1,512,565	1,655,980
West Virginia	24,780	618,457	762,794
North Carolina	52,250	1,399,750	1,617,947
South Carolina	30,570	995,577	1,151,149
Georgia	59,475	1,542,180	1,837,353
Florida	58,680	269,493	391,422
Total	282,535	7,597,197	8,857,920
North Central States.			
Ohio	41,060	3,198,062	3,672,316
Indiana	36,350	1,978,301	2,192,404
Illinois	56,650	3,077,871	3,826,351
Michigan	58,915	1,636,937	2,093,889
Wisconsin	56,040	1,315,497	1,686,880
Minnesota	83,365	780,773	1,301,826
Iowa	56,025	1,624,615	1,911,896
Missouri	69,415	2,168,380	2,679,184
North Dakota	70,795	36,909	182,719
South Dakota	77,650	98,268	328,808
Nebraska	77,510	452,402	1,058,910
Kansas	82,080	996,096	1,427,096
Total	765,855	17,364,111	22,362,279
South Central States.			
Kentucky	40,400	1,648,690	1,858,635
Tennessee	42,050	1,542,359	1,767,518
Alabama	52,250	1,262,505	1,513,017
Mississippi	46,810	1,131,597	1,289,600
Louisiana	48,720	939,946	1,118,587
Texas	265,780	1,591,749	2,235,523
Oklahoma (Territory)	39,030	—	61,834
Arkansas	53,850	802,525	1,128,179
Total	588,890	8,919,371	10,972,893

Western States.	Area in sq. miles.	Taxable Population, 1880.	Taxable Population, 1890.
Montana	146,080	39,159	132,159
Wyoming	97,890	20,789	60,705
Colorado	103,925	194,327	412,198
New Mexico (Territory)	122,580	119,565	153,593
Arizona (Territory)	113,020	40,440	59,620
Utah (Territory)	84,970	143,963	207,905
Nevada	110,700	62,266	45,761
Idaho	84,800	32,610	84,385
Washington	69,180	75,116	349,390
Oregon	96,030	174,768	313,767
California	158,360	864,694	1,208,130
Total	1,187,535	1,767,697	3,027,613
Alaska (Territory)	577,390	33,426	31,795
Indian Territory	31,400	79,024	186,490
Other Indians not taxed	—	—	141,709
U.S. Portion of Gt. Lakes	65,177	—	—
Del and New York Bays	720	—	—
Total, United States	3,668,167	50,268,233	62,982,244

GROWTH OF THE POPULATION SINCE THE FIRST CENSUS (1790).

Year.	White.	Free Coloured.	Slave.	Total.
1790	3,172,006	59,527	697,681	3,929,214
1810	5,862,073	186,446	1,191,362	7,239,881
1830	10,537,378	319,599	2,009,043	12,866,020
1840	14,195,805	386,293	2,487,355	17,069,453
1860	26,922,537	488,070	3,953,760	31,433,321
1880	43,402,970	6,580,793	—	50,155,783
1890	54,983,890	7,638,360	—	62,622,250

Note.—The results of the 11th Census (1890) shew an aggregate taxable population of 32,067,880 males, 30,554,370 females; 53,372,703 native born, 9,249,547 foreign born; 54,983,890 white, 7,638,360 coloured. The increase in native born during the decade was 22·76 per cent. as against 31·78 per cent. for the decade ending 1880. The increase in foreign born for the same periods was 38·47 and 19·99 per cent. respectively. The rate of increase for the whole white population was 26·68 and for the coloured 13·11 per cent. Hence the whites are increasing about twice as rapidly as the coloured, a result which may be regarded as the surprise of the 1890 Census, as the contrary was supposed to be the case. It appears on the other hand that 14·77 per cent. of the population in 1890 were foreign born, as against 13·32 per cent. in 1880 and 9·68 per cent. in 1850.

IMMIGRATION RETURNS FOR THE DECADE ENDING 1891.

Year.	British Isles.	Germany.	Scandinavia.	Austria-Hungary.
1882	179,423	250,630	105,326	29,150
1884	129,294	179,676	52,728	35,571
1886	112,548	84,403	46,735	28,680
1888	182,203	109,717	81,924	45,811
1891	122,311	113,554	60,107	71,042

Year.	Italy.	Russia.	France.	Total.
1882	32,159	21,590	6,004	788,992
1884	16,515	17,225	3,608	518,592
1886	21,315	21,739	3,318	334,203
1888	51,558	39,313	6,454	546,889
1891	76,955	74,923	6,770	560,319

Total Immigration, 1820-1891:—15,946,410.

CHIEF RELIGIOUS DENOMINATIONS (1890).

Roman Catholics	6,250,045	Congregational	491,985
Methodists of various Sects	4,980,240	Episcopal	480,176
Baptists of various Sects	4,292,291	Friends	106,930
Presbyterians	1,229,012	Mormons	144,352
Lutherans	1,086,048	Jews (1889)	13,683

EDUCATIONAL RETURNS (1890).

	Enrolled in Public Schools.	Average Daily Attendance.	Expended for Public Schools.	No. of Colleges.	No. of Teachers.	No. of Students.
North Atlantic States	3,105,991	2,040,445	$48,006,369	72	1,671	21,542
South Atlantic States	1,746,685	1,116,276	8,400,291	56	686	9,258
South Central States	2,307,289	1,470,745	10,684,340	73	782	17,430
North Central States	5,015,217	3,188,732	63,047,172	184	2,000	48,287
Western States	513,285	333,612	10,130,815	30	364	6,453
Total	12,688,467	8,151,810	$140,268,087	415	5,503	102,970

PERIODICAL LITERATURE (1889).

		Circulation.			Circulation.
Daily Newspapers	1,494	5,713,750	Monthlies	1,898	7,472,750
Weeklies	12,234	19,588,000	Sundries	693	—

CRIME AND PAUPERISM.

Convicts in penitentiaries (1880), 35,538; (1890) 45,233; of whom 30,546 whites, 14,687 coloured, 21,173 native born, 7,267 foreign born.

Indoor paupers (1880), 66,203; (1890) 73,045; of whom 66,578 whites, 6,467 coloured, 27,646 foreign.

RETURNS OF INDIAN RESERVATIONS.

States and Territories.	Area of Reserves in square miles.	Indian Population, 1890.	States and Territories.	Area of Reserves in square miles.	Indian Population, 1890.
Arizona	10,317	30,749	North Carolina	102	3,000
California	772	12,108	North Dakota	9,158	7,759
Colorado	1,710	1,793	Oklahoma	20,770	13,176
Idaho	3,552	4,251	Oregon	3,242	4,507
Indian Territory	40,411	68,225	South Dakota	18,221	19,696
Iowa	2	399	Texas	—	290
Kansas	159	1,016	Utah	6,207	2,211
Michigan	42	7,428	Washington	6,321	9,830
Minnesota	3,523	6,403	Wisconsin	800	9,152
Montana	16,549	10,842	Wyoming	3,660	1,658
Nebraska	214	3,254	Miscellaneous	—	1,302
Nevada	1,490	8,375			
New Mexico	15,629	10,998	Total, 1890	162,991	243,524
New York	137	5,112	Total, 1880	241,800	256,127

FEDERAL FINANCE.

Year.	Revenue.	Expenditure.	Year.	Revenue.	Expenditure.
1882	$403,525,250	$257,981,440	1887	$371,403,277	$267,932,180
1884	348,519,869	244,126,244	1891	392,612,447	355,372,685

Income, 1892 (est.).		Outlay, 1892 (est.).	
Customs	$185,000,000	Civil Service and Sundries	$100,000,000
Internal Revenue	152,000,000	Pensions	125,000,000
Postal Service	71,000,000	Indians	12,000,000
Miscellaneous	25,000,000	Military and Naval Departments	78,000,000
		Interest on Debt	23,000,000
		Postal Service	71,000,000
Total	$433,000,000	Total	$409,000,000

Public Debt at Various Periods:—

Year.		Year.	
1860 (before the Civil War)	$65,000,000	1884	$1,830,000,000
1866	2,773,000,000	1887	1,700,000,000
1877	2,205,000,000	1892	903,000,000

Assessed value of real and personal property (1890) . . . $24,250,000,000

Estimated true value (1880) 43,642,000,000

State and County Debts (1890) . . $365,000,000 = $5·83 per head of population.

FEDERAL ARMY.

Officers, 2,169; Men 25,000.

FEDERAL NAVY (1891).

Vessels in commission, 17; building, 20.

AGRICULTURAL RETURNS.

CEREAL CROPS:—

Year.	Acres.	Bushels.	Value.
1886	142,000,000	2,812,000,000	$1,162,000,000
1890	134,000,000	2,402,000,000	1,311,000,000

	Acres.	Bushels.	Value.
Indian Corn (1891)	76,204,000	2,060,000,000	$836,440,000
Wheat (1891)	40,000,000	611,780,000	513,472,000
Oats (1891)	25,582,000	736,394,000	232,000,000
Cotton (1888)	19,000,000	6,940,000	292,000,000
Tobacco (1889)	692,000	(lbs.) 488,000,000	34,844,000

Cotton crop (1890), 3,628,520,000 lbs., the largest ever raised.
Sugar (1890), 136,494 tons, produced mostly in Louisiana.
Vineyards (1889), 402,000 acres; 24,307,000 gallons of wine; 1,372,000 boxes of raisins (California).

LIVE-STOCK.

	1870.	1880.	1890.	1891.
Cattle	25,484,000	33,258,000	52,802,000	52,895,000
Sheep	40,853,000	40,765,000	44,336,000	43,431,000
Swine	26,751,000	34,034,000	51,603,000	50,625,000
Horses	8,249,000	11,202,000	14,976,000	14,056,000

Lumber (1888), 30,000,000,000 cubic feet; value, $600,000,000.

MINING RETURNS (1890).

	Quantity.	Value.
Pig iron	9,202,703 tons	$151,200,410
Silver	54,500,000 troy oz.	70,464,645
Gold	1,588,880 ,,	32,845,000
Copper	265,115,133 lbs.	30,848,797
Lead	161,754 tons	14,266,703
Zinc	63,683 ,,	6,266,407
Quicksilver	22,926 flasks	1,203,615
Bituminous Coal	99,392,871 tons	110,420,800
Anthracite	41,490,000 ,,	66,384,000
Petroleum	46,000,000 barrels	35,400,000
Natural Gas	—	18,700,000
Salt	8,777,000 ,,	4,752,000

YIELD OF PRECIOUS METALS FOR THE THREE YEARS ENDING 1891.

Year.	Gold.	Silver.	Total.
1889	$32,886,744	$66,396,988	$99,283,732
1890	32,845,000	70,464,645	103,309,645
1891	33,250,000	74,820,000	108,450,000

MANUFACTURES.

Year.	No. of Factories.	Hands Employed.	Value of Products.
1870	252,148	2,053,996	$3,385,760,000
1880	253,852	2,732,595	5,370,000,000

Cotton goods (1880), 2,771,798,000 lbs.; (1890) 3,628,520,000 lbs.
Pig iron (1882), 5,178,000 tons; (1890) 10,307,000 tons.
Rolled iron (1889), 2,586,000 tons; (1890) 2,820,000 tons.
Bessemer steel ingots (1887), 3,288,000 tons; (1890) 4,131,000 tons.
Bessemer steel rails (1890), 2,013,000 tons.

FISHERIES.

Whale and seal fisheries (1889), 101 vessels of 22,660 tons: products, $1,835,000.
Fur, seal, and other industry (1889), $125,000.
Capital invested in all the fisheries (1880), $37,500,000; hands employed, 131,426; value of products, $43,000,000.

TRADE RETURNS.

Year.	Exports.	Imports.	Total.
1867	$294,504,141	$395,761,096	$690,267,237
1877	602,475,220	451,323,126	1,053,798,346
1891	884,480,810	844,916,193	1,729,397,006

General Exports (1891).	Value.
Unmanufactured:—Agricultural	$642,751,344
Mines	22,054,970
Forests	28,715,713
Fisheries	6,208,577
All others	3,612,364
Manufactured	168,927,315
Total	$827,270,283

General Imports (1891).	Value.
Food and Animals	$284,715,737
Raw Materials	196,393,669
Wholly or partly manufactured	107,024,423
Manufactured and ready for consumption	138,469,966
Luxuries	118,312,401
Total	$844,916,196

	Exports to.	Imports from.
United Kingdom	$441,600,000	$194,723,000
Germany	91,685,000	97,316,000
France	59,826,000	76,689,000
British N. America	37,345,000	39,434,000
Belgium	26,694,000	10,945,000
Netherlands	23,817,000	12,422,000
Spain	14,608,000	6,033,000
Italy	15,927,000	21,678,000
Russia	7,925,000	4,833,000
British Australasia	12,892,000	6,239,000

	Exports to.	Imports from.
Cuba	$11,930,000	$61,714,000
Mexico	14,199,000	27,296,000
British West Indies	9,546,000	16,293,000
Brazil	14,049,000	83,230,000
China	8,700,000	19,321,850
Japan	5,277,000	3,243,000
Haiti	4,101,000	19,309,000
C. American States	5,104,000	9,799,000
British East Indies	4,655,000	23,357,000

MERCANTILE MARINE (1891).

	Sailing Vessels.		Steamers.		Canal Boats.		Barges.		Total	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Atlantic and Gulf Coasts	13,085	1,599,287	2,935	886,375	443	48,484	1,101	246,537	17,564	2,780,683
Pacific Coast	871	247,319	578	187,429	—	—	9	6,109	1,458	440,858
Nrthrn. Lakes	1,243	325,131	1,592	736,752	703	72,515	62	20,472	3,600	1,154,870
Wstrn. Rivers	--	—	1,111	205,708	—	—	166	102,640	1,277	308,348
Total, 1891	15,199	2,171,737	6,216	2,016,264	1,146	120,999	1,338	375,758	23,889	4,684,759

NAVIGATION.

Vessels Entered.

	1889.		1891.	
	No.	Tonnage.	No.	Tonnage.
American	10,459	3,724,325	11,046	4,380,804
Foreign	21,387	12,227,794	21,532	13,823,491
Total	31,846	15,952,119	32,578	18,204,295

Cleared.

	No.	Tonnage.	No.	Tonnage.
American	10,878	3,988,454	11,182	4,455,402
Foreign	21,498	12,354,693	21,521	13,805,430
Total	32,376	16,343,147	32,703	18,260,832

Proportion of foreign trade carried by American vessels (1856), 75·2 per cent.; (1891), 11·94 per cent.

RAILWAYS.

	1830.	1850.	1870.	1890.	1892.
Lines open	23 miles	9,000	53,400	84,393	171,000

Total capital invested in railways (1890), $9,681,000,000; gross yearly earnings, $1,003,735,000; net earnings, $322,285,000.

TELEGRAPHS AND TELEPHONES.

Miles open (1890), 210,000, mostly owned by the Western Union Telegraph Company, which in 1890 had 679,000 miles of wire and 19,382 offices. Messages sent, 55,887,000; receipts, $22,389,000; expenses, $15,000,000.

Telephone wires in use (1890), 250,000 miles.

POST OFFICE RETURNS.

Year.	Pieces of Mail handled.	Registered Packages.	Sacks handled.	Total.
1886	5,329,521,475	15,525,844	798,725	5,345,846,044
1890	7,847,723,600	16,576,293	1,138,208	7,865,438,101

STATISTICS OF THE STATES AND TERRITORIES.

MAINE (Capital, Augusta).

Position in the Union:—	No.
Superficial area, 33,040 square miles	39
Population (1890), 661,086	30
Density to the square mile, 20	30

Chief Towns, with Population (1890):—Portland, 36,425; Lewiston, 21,701; Bangor, 19,103; Biddeford, 14,443; Auburn, 11,250; Augusta, 10,527; Bath, 8,723.

NEW HAMPSHIRE (Capital, Concord).

Position in the Union:—	No.
Superficial area, 9,305 square miles	45
Population (1890), 376,530	33
Density to the square mile, 40·40	15

Chief Towns, with Population (1890):—Manchester, 44,126; Nashua, 19,311; Concord, 17,004; Dover, 12,790; Portsmouth, 9,827.

VERMONT (Capital, Montpelier).

Position in the Union:—	No.
Superficial area, 9,565 square miles	44
Population (1890), 332,422	36
Density to the square mile, 34·75	20

Chief Towns, with Population (1890):—Burlington, 14,590; Rutland, 11,760; Saint Albans, 7,771; Brattleboro, 6,862.

MASSACHUSETTS (Capital, Boston).

Position in the Union:—	No.
Superficial area, 8,315 square miles	46
Population (1890), 2,238,943	6
Density to the square mile, 269·26	3
Public Instruction (7,859 schools, 443,644 scholars)	1
Industrial products, $549,346,552	3

Boston:—Shipping (1890):—Entered, 5,387 vessels of 1,923,545 tons.
Total imports, $66,000,000; exports, $72,500,000.
Commercial fleet (1890), 634 of 251,526 tons.

Chief Towns, with Population (1890):—Boston, 448,477; Environs of Boston: Cambridge, 70,028; Somerville, 40,152; Chelsea, 27,909; Newton, 24,379; Malden, 23.031; Waltham, 18,707; Brookline, 12,103; Medford, 11,079. Worcester, 84,655; Lowell, 77,696; Fall River, 74,398; Lynn, 55,727; Lawrence, 44,654; Springfield, 44,179; New Bedford, 40,733; Holyoke, 35,637; Salem, 30,801; Haverhill, 27,412; Brockton, 27,294; Taunton, 25,448; Gloucester, 24,651; Fitchburg, 22,037.

RHODE ISLAND (Capital, Providence).

Position in the Union:—	No.
Superficial area, 1,250 square miles	50
Population (1890), 345,506	35
Density to the square mile, 276·40	2

Chief Towns, with Population (1890):—Providence, 132,146; Pawtucket, 27,633; Woonsocket, 20,830; Lincoln, 20,355; Newport, 19,457.

CONNECTICUT (Capital, Hartford).

Position in the Union:—	No.
Superficial area, 4,990 square miles	48
Population (1890), 746,258	29
Density to the square mile, 149·55	5

Chief Towns, with Population (1890):—New Haven, 81,298; Hartford, 53,230; Bridgeport, 48,866; Waterbury, 28,646; Meriden, 21,652; New Britain, 19,007; Norwalk, 17,747; Danbury, 16,552; Norwich, 16,156; Stamford, 15,700; New London, 15,700.

NEW YORK (Capital, Albany).

Position in the Union:—	No.
Superficial area, 49,170 square miles	29
Population (1890), 6,003,157 (inc. 5,304 Indians not taxed)	1
Density to the square mile, 122	6
Trade, $1,000,000,000	1
Industries, $1,800,000,000	1

Erie Canal, navigation (1889), 5,370,370 tons.
New York City:—Imports (1891), $402,764,000: exports, $368,000,000.
Shipping (1890): entered, 5 407 of 6,258,222 tons; cleared, 4,947 of 6,025,518 tons.
Hudson River, navigation between New York and Albany (1890), 18,582,596 tons
Buffalo, shipping (1890), 1,936 vessels of 285,120 tons entered and cleared.

Chief Towns, with Population (1890):—New York (official), 1,515,301; New York (amended), 1,710,715; Brooklyn and Long Island City, 836,849; Buffalo, 255,664; Rochester, 133,896; Albany, with environs, 109,163; Syracuse, 88,143; Troy, with environs, 85,665; Utica, 44,007; Binghampton, 35,005; Yonkers, 32,033; Elmira, 30,893; Auburn, 25,858; Newburgh, 23,087; Poughkeepsie, 22,206; Cohoes, 22,509; Oswego, 21,842; Kingston, 21,261.

NEW JERSEY (Capital, Trenton).

Position in the Union:—	No.
Superficial area, 7,815 square miles	47
Population (1890), 1,444,933	18
Density to the square mile, 184·89	4

Chief Towns with Population (1890):—Newark, 181,830; Jersey City, 163,003; Paterson, 78,347, Camden and Gloucester, 64,877; Trenton, 57,458; Hoboken, 43,648; Elizabeth, 37,764.

PENNSYLVANIA (Capital, Harrisburg).

Position in the Union:—	No.
Superficial area, 45,215 square miles	32
Population (1890), 5,258,014	2
Density to the square mile, 116·28	7
Output:—Coal, 77,000,000 tons (58 per cent. of the Union)	1
Petroleum (with New York), 900,000,000 gallons	1
Pig iron, 4,712,000 tons	1

Philadelphia:—Industries (1890), $200,000,000; foreign trade, $78,000,000.
Shipping: 1,416 vessels of 1,410,640 tons entered.
Commercial fleet, 1,025 vessels of 255,695 tons.

Chief Towns, with Population (1890):—Philadelphia, 1,046,964; Pittsburg, 238,617; Allegheny, 105,287; Scranton, 75,215; Reading, 58,661; Erie, 40,634; Harrisburg, 39,385; Wilkesbarre, 37,718; Lancaster, 32,011; Altoona, 30,337; Williamsport, 27,132; Allentown, 25,228; Johnstown, 21,805.

DELAWARE (Capital, Dover).

Position in the Union:—	No.
Superficial area, 2,050 square miles	49
Population (1890), 168,493	43
Density to the square mile, 82 19	10

Chief Towns, with Population (1890):—Wilmington, 61,437; New Castle, 4,010; Dover, 3,061.

MARYLAND (Capital, Annapolis).

Position in the Union:—	No.
Superficial area, 12,210 square miles	43
Population (1890), 1,042,390	27
Density to the square mile, 85·37	9

Baltimore:—Exports (1890), $73,984,000; imports, $13,140,000.
Foreign shipping (1890), 703 vessels of 845,239 tons entered.

Chief Towns, with Population (1890):—Baltimore, 434,439; Cumberland, 12,729; Hagerstown, 10,118; Frederick, 8,193; Annapolis, 7,604.

FEDERAL DISTRICT OF COLUMBIA (Capital, Washington).

Position in the Union:—	No.
Superficial area, 70 square miles	51
Population, 230,392	39
Density to the square mile, 3,291·31	1

VIRGINIA (Capital, Richmond).

Position in the Union:—	No.
Superficial area, 42,450 square miles	33
Population (1890), 1,655,980	15
Density to the square mile, 39	16

Newport News, shipping (1890), 188 vessels of 266,138 tons entered and cleared.
Norfolk, Portsmouth, and Berkley, shipping (1890), 179 vessels of 183,533 tons entered and cleared.

Chief Towns, with Population (1890):—Richmond, with Manchester, 90,634; Norfolk, with Portsmouth, &c., 52,038; Petersburg, 22,680; Lynchburg, 19,709; Roanoke, 16,159; Alexandria, 14,359.

WEST VIRGINIA (Capital, Charleston).

Position in the Union:—	No.
Superficial area, 24,780 square miles	42
Population (1890), 762,794	28
Density to the square mile, 30·78	24

Chief Towns, with Population (1890):—Wheeling, 34,522; Huntington, 10,108; Parkersburg, 8,408; Martinsburg, 7,226; Charleston, 6,742; Grafton, 3,159.

NORTH CAROLINA (Capital, Raleigh).

Position in the Union:—	No.
Superficial area, 52,250 square miles	28
Population (1890), 1,620,832 (inc. 2,885 Indians not taxed)	16
Density to the square mile, 31	22

Chief Towns, with Population (1890):—Wilmington, 20,056; Raleigh, 12,678; Charlotte, 11,557.

SOUTH CAROLINA (Capital, Columbia).

Position in the Union:—	No.
Superficial area, 30,570 square miles	41
Population (1890), 1,151,149	23
Density to the square mile, 37·65	18

Charleston:—Shipping (1890), 347 vessels of 207,679 tons.
Foreign trade (1889), $16,744,000.

Chief Towns, with Population (1890):—Charleston, 54,955; Columbia, 15,353.

GEORGIA (Capital, Atlanta).

Position in the Union:—	No.
Superficial area, 59,475 square miles	20
Population (1890), 1,837,353	12
Density to the square mile, 30·89	23

Savannah, shipping (1890), 502,000 tons; exports, $30,884,000.

Chief Towns, with Population (1890):—Atlanta, 65,533; Savannah, 43,189; Augusta, 33,300.

FLORIDA (Capital, Tallahassee).

Position in the Union:—	No.
Superficial area, 58,680 square miles	22
Population (1890), 391,422	32
Density to the square mile, 6·67	36

Key West, shipping (1890), 584 vessels of 261,578 tons.
Pensacola, shipping (1890), 1,132 vessels of 815,778 tons.

Chief Towns, with Population (1890):—Key West, 18,080; Jacksonville, 17,201; Pensacola, 11,750; Tampa, 5,532; Saint Augustine, 4,742; Palatka, 3,039; Tallahassee, 2,934.

OHIO (Capital, Columbus).

Position in the Union:—	No.
Superficial area, 41,060 square miles	35
Population (1890), 3,672,316	4
Density to the square mile, 89·43	8
Output:—Coal, 9,977,000 tons	3
Petroleum, 418.000,000 gallons	2

Cleveland, shipping, 1,665 vessels of 226,184 tons, trading with Canada.
Cincinnati: factories, 6,774; products, $204,000,000.

Chief Towns, with Population (1890):—Cincinnati, with suburbs, 359,147; Cleveland, 261,353; Columbus, 88,150; Toledo, 81,434; Dayton, 61,220; Youngstown, 33,220; Springfield, 31,895; Akron, 27,601; Canton, 26,189; Zanesville, 21,009; Findlay, 18,553; Sandusky, 18,471; Hamilton, 17,565.

INDIANA (Capital, Indianapolis).

Position in the Union:—	No.
Superficial area, 35,910 square miles	38
Population (1890), 2,192,404	8
Density to the square mile, 60·31	12

Chief Towns, with Population (1890):—Indianapolis, 105,436; Evansville, 50,756; Fort Wayne, 33,393; Terre Haute, 30,217; South Bend, 21,819; New Albany, 21,059.

ILLINOIS (Capital, Springfield).

Position in the Union:—	No.
Superficial area, 56,650 square miles	23
Population (1890), 3,826,351	3
Density to the square mile, 67·54	11
Output of coal, 12,104,000 tons	2

Chicago:—Shipping (1890), 25,000 vessels of 9,000,000 tons.
Export of cereals and flour (1890), 104,000,000 bushels.
Total value of exchanges (1887), $1,103,000,000.

Chief Towns, with Population (1890):—Chicago, 1,099,850; Peoria, 41,024; Quincy, 31,494; Springfield, 24,963; Joliet, 23,264; Bloomington, with Normal, 24,748; Rockford, 23,584; Aurora, 19,688; Elgin, 17,823; Decatur, 16,841; Belleville, 15,361.

MICHIGAN (Capital, Lansing).

Position in the Union:—	No.
Superficial area, 58,915 square miles	21
Population (1890), 2,093,889	9
Density to the square mile, 35·54	19
Yield of copper, 38,480 tons	2

Detroit:—Interlacustrine navigation (1890), 18,646,000 tons.
Shipping, 6,455 vessels of 540,483 tons, trading with Canada.
Sainte Marie Canal, navigation (1890), 8,288,580 tons.

Chief Towns, with Population (1890):—Detroit, 205,876; Grand Rapids, 60,278; Saginaw, 46,322; Muskegon, 22,702; Bay City, 27,839; Jackson, 20,798; Kalamazoo, 17,853; Port Huron, 13,543; Battle Creek, 13,197; Lansing, 13,102; West Bay City, 12,981; Manistee, 12,812.

WISCONSIN (Capital, Madison).

Position in the Union:—	No.
Superficial area, 56,040 square miles	24
Population (1890), 1,694,795 (inc. 7,915 Indians not taxed)	14
Density to the square mile, 30·24	25

Milwaukee, shipping (1889), 10,912 vessels of 5,763,200 tons.

Chief Towns, with Population (1890):—Milwaukee, 240,468; La Crosse, 25,090; Oshkosh, 22,836; Racine, 21,014; Eau Claire, 17,415; Sheboygan, 16,359; Madison, 13,426.

MINNESOTA (Capital, Saint Paul).

Position in the Union:—	No.
Superficial area, 83,365 square miles	13
Population (1890), 1,308,089 (inc. 6,263 Indians not taxed)	20
Density to the square mile, 15·69	32

Duluth, shipping (1890), 346 vessels of 189,714 tons.

Chief Towns, with Population (1890):—Minnesota and Saint Anthony, 203,405; Saint Paul, 133,156; Duluth, 33,115; Winona, 18,208.

IOWA (Capital, Des Moines).

Position in the Union:—	No.
Superficial area, 56,025 square miles	25
Population (1890), 1,912,293 (inc. 397 Indians not taxed)	10
Density to the square mile, 34·13	21

Chief Towns, with Population (1890):—Des Moines, 50,093; Sioux City, 37,806; Dubuque, 30,311; Davenport, 26,872; Burlington, 22,565; Council Bluffs, 21,474; Cedar Rapids, 18,020.

MISSOURI (Capital, Jefferson City).

Position in the Union:—	No.
Superficial area, 69,415 square miles	18
Population (1890), 2,679,184	5
Density to the square mile, 38·59	17
Production of zinc (1890), 93,131 tons	1

Chief Towns, with Population (1890):—Saint Louis, 451,770; Kansas City, 132,716; Saint Joseph, 52,324; Springfield, 21,850; Sedalia, 14,068; Hannibal, 12,857; Joplin, 9,943.

NORTH DAKOTA (Capital, Bismarck).

Position in the Union:—	No.
Superficial area, 70,795 square miles	17
Population (1890), 190,531 (inc. 7,812 Indians not taxed)	42
Density to the square mile, 2·69	42

SOUTH DAKOTA (Capital, Pierre).

Position in the Union:—	No.
Superficial area, 77,650 square miles	15
Population (1890), 347,876 (inc. 19,068 Indians not taxed)	37
Density to the square mile, 4·48	39

Chief Towns, with Population (1890):—Sioux Falls, 10,177; Yankton, 3,670; Deadwood, 3,235.

NEBRASKA (Capital, Lincoln).

Position in the Union:—	No.
Superficial area, 77,510 square miles	16
Population (1890), 1,062,661 (inc. 3,751 Indians not taxed)	26
Density to the square mile, 13·70	33

Chief Towns, with Population (1890):—Omaha and South Omaha, 148,514; Lincoln, 55,154.

KANSAS (Capital, Topeka).

Position in the Union:—	No.
Superficial area, 82,080 square miles	14
Population (1890), 1,428,112 (inc. 1,016 Indians not taxed)	19
Density to the square mile, 17·39	31

Chief Towns, with Population (1890):—Kansas City, 38,316; Topeka, 31,007; Wichita, 23,853.

KENTUCKY (Capital, Frankfort).

Position in the Union:—	No.
Superficial area, 40,400 square miles	36
Population (1890), 1,858,635	11
Density to the square mile, 46	13
Yield of tobacco (1890), 180,000,000 lbs.	1

Chief Towns, with Population (1890):—Louisville, with Jeffersonville and New Albany, 193,279; Covington and Newport, 62,289; Lexington, 21,567; Paducah, 12,797; Owensboro, 9,837.

TENNESSEE (Capital, Nashville).

Position in the Union:—	No.
Superficial area, 42,050 square miles	34
Population (1890), 1,767,518	13
Density to the square mile, 42	14

Chief Towns:—Nashville, 76,168; Memphis, 64,495; Chattanooga, 29,100; Knoxville, 22,535.

ALABAMA (Capital, Montgomery).

Position in the Union:—	No.
Superficial area, 52,250 square miles	27
Population (1890), 1,513,017	17
Density to the square mile, 28·95	26

Yield of iron (1890), 1,780,000 tons.

Chief Towns:—Mobile, 31,076; Birmingham, 26,178; Montgomery, 21,883.

MISSISSIPPI (Capital, Jackson).

Position in the Union:—	No.
Superficial area, 46,810 square miles	31
Population (1890), 1,289,600	21
Density to the square mile, 27·54	27

Chief Towns, with Population (1890):—Vicksburg, 13,373; Meridian, 10,624; Natchez, 10,101.

LOUISIANA (Capital, Baton Rouge).

Position in the Union:—	No.
Superficial area, 48,720 square miles	30
Population (1890), 1,118,587	25
Density to the square mile, 22·95	28
Production of sugar (1890), 220,000 tons	1

New Orleans:—Shipping (1890), 1,905 vessels of 2,145,784 tons. Cotton exported (1890), 1,650,000 bales. Total value of the exchanges, $183,300,000.

Chief Towns:—New Orleans, 242,039; Shreveport, 11,979; Baton Rouge, 10,478.

TEXAS (Capital, Austin).

Position in the Union:—	No.
Superficial area, 262,290 square miles	2
Population (1890), 2,235,523	7
Density to the square mile, 8·41	34
Cotton crop (1890), 1,700,000 bales	1

Galveston, shipping (1890), 454 vessels of 343,575 tons.

Chief Towns, with Population (1890):—Dallas, 38,067; San Antonio de Bexar, 37,673; Galveston, 29,084; Houston, 27,557; Fort Worth, 23,076; Austin (1891), 14,575; Waco, 14,445.

INDIAN TERRITORY (Capitals, Tahlequah, Ockmulgee).

Position in the Union:—	No.
Superficial area, 31,400 square miles	40
Population (1890), 186,490 (Indians and whites not taxed)	41
Density to the square mile, 5·93	37

OKLAHOMA (Capital, Guthrio).

Position in the Union:—	No.
Superficial area, 39,030 square miles	37
Population (1890), 67,517 (inc. 5,683 Indians not taxed)	47
Density to the square mile, 1·72	44

ARKANSAS (Capital, Little Rock).

Position in the Union:—	No.
Superficial area, 53,850 square miles	26
Population (1890), 1,128,179	24
Density to the square mile, 20·95	29

Chief Towns, with Population (1890):—Little Rock, 25,874; Fort Smith, 11,311.

MONTANA (Capital, Helena).

Position in the Union:—	No.
Superficial area, 146,080 square miles	4
Population (1890), 142,495 (inc. 10,336 Indians not taxed)	45
Density to the square mile, 0·97	47
Yield of gold and silver (1890), $31,727,000	1

Chief Towns, with Population (1890):—Helena, 13,834; Butte City, 10,723.

WYOMING (Capital, Cheyenne).

Position in the Union:—	No.
Superficial area, 97,890 square miles	9
Population (1890), 63,074 (inc. 2,369 Indians not taxed)	48
Density to the square mile, 0·64	49

Chief Towns, with Population (1890):—Cheyenne, 11,690; Laramie City, 6,388.

COLORADO (Capital, Denver).

Position in the Union:—	No.
Superficial area, 103,925 square miles	8
Population (1890), 413,183 (inc. 985 Indians not taxed)	31
Density to the square mile, 3·97	40
Yield of gold and silver (1888), $22,758,000	2
,, lead (1890), 70,788 tons	1

Chief Towns:—Denver, 106,713; Pueblo, 24,558; Colorado Springs, 11,140; Leadville, 10,384.

NEW MEXICO (Capital, Santa Fé).

Position in the Union:—	No.
Superficial area, 122,580 square miles	5
Population (1890), 182,392 (inc. 28,799 Indians not taxed)	44
Density to the square mile, 1·45	45

Chief Towns, with Population (1890):—Santa Fé, 6,185; Albuquerque, 5,518; Las Vegas, 4,697.

ARIZONA (Capital, Phœnix).

Position in the Union:—	No.
Superficial area, 113,020 square miles	6
Population (1890), 75,034 (inc. 15,414 Indians not taxed)	49
Density to the square mile, 0·66	48

Chief Towns, with Population (1890):—Tucson, 5,150; Phœnix, 3,152.

UTAH (Capital, Salt Lake City).

Position in the Union:—	No.
Superficial area, 84,970 square miles	11
Population (1890), 209,759 (inc. 1,854 Indians not taxed)	40
Density to the square mile, 2·46	43

Chief Towns, with Population (1890):—Great Salt Lake City, 44,843; Ogden City, 14,889.

NEVADA (Capital, Carson City).

Position in the Union:—	No.
Superficial area, 110,700 square miles	7
Population (1890), 47,313 (inc. 1,552 Indians not taxed)	50
Density to the square mile, 0·42	50
Yield of gold and silver (1888), $10,525,000	4

Chief Towns, with Population (1890):—Virginia City, 8,511, Carson City, 3,950.

IDAHO (Capital, Boisé City).

Position in the Union:—	No.
Superficial area, 84,800 square miles	12
Population (1890), 88,025 (inc. 3,640 Indians not taxed)	46
Density to the square mile, 1	46

WASHINGTON (Capital, Olympia).

Position in the Union:—	No.
Superficial area, 69,180 square miles	19
Population (1890), 357,328 (inc. 7,938 Indians not taxed)	34
Density to the square mile, 5·16	38

Chief Towns, with Population (1890):—Seattle, 42,837; Tacoma, 36,006; Spokane, 19,922.

OREGON (Capital, Salem).

Position in the Union:—	No.
Superficial area, 96,030 square miles	10
Population (1890), 317,475 (inc. 3,708 Indians not taxed)	38
Density to the square mile, 3·30	41

Chief Towns, with Population (1890):—Portland, with East Portland and Albina, 62,046.

CALIFORNIA (Capital, Sacramento).

Position in the Union:—	No.
Superficial area, 158,360 square miles	3
Population (1890), 1,213,150 (inc. 5,020 Indians not taxed)	22
Density to the square mile, 7·66	35
Yield of gold (1890), $9,986,580	1

Francisco:—Shipping (1890), 1,636 vessels of 2,111,512 tons; imports $48,751,000, exports $36,876.

Chief Towns, with Population (1890):—San Francisco, 298,997; Los Angeles, 50,395; Oakland, 48,682; Sacramento, 26,386; San José, 18,060; San Diego, 16,159; Stockton, 14,424.

ALASKA (Capital, Sitka).

Position in the Union:—	No.
Superficial area, 577,390 square miles	1
Population (1890), 31,795 (Indians and whites not taxed)	51
Density to the square miles, 0·05	51

INDEX.

END OF VOL. III.