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to ascertain what changes they undergo.* Carbonic acid springs (*ölkeldur*) are found in a few places, but more particularly on Snæfellsnes. On the other hand, solfataras and pits of boiling mud (*maccalubas*) are very common in the volcanic regions where tuff is the predominating rock. The solfataras at Krisuvík and Mývatn are very well known. I also discovered (1888) solfataras of grand proportions and with marked peculiarities in the liparite mountains of Kerlingarfjöll near Arnarfellsjökull. Smaller sulphur springs exist in several other places, more especially on the peninsula of Reykjanes.

Herewith my brief survey of the geography and geology of Iceland must come to an end. I am painfully conscious of its imperfections; but if I have in this way made it easier for those, who take an interest in the physical phenomena of my native island, to find the sources for the more recent discoveries that have been made, I shall not have written altogether in vain. May I conclude with the wish that on some future occasion I may have the privilege of describing for English readers at greater length some of the more remarkable of the many remarkable physical phenomena which Iceland is able to offer for scientific study?

THE EASTERN GATEWAY OF THE UNITED STATES.

By Prof. A. P. BRIGHAM, Colgate University, U.S.A.

THE mountain barrier of eastern North America stretches from Central Alabama, north-easterly through Labrador. The vast lowlands of the Mississippi valley and the great plains of Canada lie on the west, and the Atlantic ocean, with a rim of coastal lowlands, on the east. The mountains are nowhere lofty as compared with the high mountains of the globe, but they are often rugged, and in the universally forested condition of the early days formed a barrier nearly impassable to human intercourse. The system is made up of elements diverse in age and character. Oldest of all are the Adirondacks of Northern New York, and the so-called Appalachian protaxis of Dana. The latter consists of the highlands of the Hudson, the uplands of New Jersey, South mountain in Pennsylvania, and the Blue Ridge of the Southern states. Extending southward through New England, not far eastward from the Adirondacks are the next oldest mountains of the system, the Green mountains of Vermont, extending south through Massachusetts and Connecticut. They fall in between Ordovician and Silurian time. The newest part of the system is the Appalachian range proper, a great series of folds in

* I have published a separate account of the remarkable group of springs at Hveravellir, near Langjökull, on the plateau, "De varme Kilder paa Hveravellir i Island," in *Ymer* (Stockholm, 1889), pp. 49-59, with a map. I have also published, in *Geogr. Tidskr.*, xii. p. 223, a map of the hot springs at Torfajökull.

Palæozoic strata, extending from Alabama to Catskill, New York, a point about 120 miles north of New York, on the Hudson river.

By successive deformations, nature seems thus to have walled in the sea-shore from the great heart of the continent. Two gateways, however, lie open. One of these is the St. Lawrence valley, cut along the pre-Palæozoic contact and across Palæozoic beds to the gulf which bears the same name. But with this gateway this paper has little to do. We go several hundred miles to the south, enter New York harbour, and sail up the tidal course of the Hudson. Soon after leaving New York we traverse the trench cut through the ancient highlands. Then we have on the east the Green mountain range, and on the west the low northern terminus of the Appalachian folds. A few miles farther west, and rising far higher, is the great easterly facing escarpment of the so-called Catskill mountains—really the north-eastern terminus of a plateau lying west of the mountain folds from Alabama to Eastern New York.

Leaving tide water at Albany, we rise over a stretch of nearly 20 miles of barren glacial sands to Schenectady, where we find an open road leading to the west. This is the Mohawk valley, the eastern gateway of the country. Northward, or on our right as we go west, rise the rugged foothills of the Adirondack mountains. Southward, on our left, are seen the bold escarpments of the Helderberg mountains, which are really the steep slope by which the long plateau drops off to low ground at its northern end.

To understand the physical history of the Mohawk valley, it will now be desirable to review briefly the geology of the region. New York is classic ground in American geology, and the subject may be touched briefly and dismissed. The outcrops of the older Palæozoic rocks run around the Adirondack nucleus, and border the pre-Palæozoic of Canada on the south. Thus the Trenton limestone, Utica shale, and Hudson river shales and sandstones extend in nearly east and west belts, south of the Adirondacks, dipping slightly southward. The Mohawk valley is cut along the strike of the Utica-Hudson shales (Ordovician) as far north as the south projecting spurs of the Adirondacks would allow. In like manner, only extending further west, we find east and west outcrops of the several Silurian and Devonian formations, until the middle and upper Devonian beds cap the plateau at heights of 2000 to 4000 feet in the Catskills, and 2000 feet or a little less farther west. The northern edges of these formations abut against the Mohawk valley, or, it would be better to say, the valley has been cut into their beds, which once stretched farther north, covering the now exposed lower flanks of the Adirondacks.

Before outlining the history of the valley, let us look more narrowly at its character. We have to do with a trench about 90 miles long, from Rome to Schenectady. Easterly it opens into the broad Hudson lowlands; westerly it widens into the lacustrine plains of Iroquois, the larger glacial antecedent of Lake Ontario. Once pass the gateway at Rome

and the path is clear, over the lake plains and prairies to the far west. Seen from the railway as we pass, the valley appears to be a trench about 500 feet deep, with moderately steep sides, and with an average width of river and flood plain of about one half-mile. Seen more truly from the bordering uplands, it is a vast gap, 1500 to 2000 feet deep, several miles wide in its higher parts, lying between the Catskill plateau and the Adirondack mountains. The altitudes are shown in the following table :—

Hudson at Albany	...	...	...	...	...	...	Tidewater
Sand-plains, Schenectady	...	...	...	...	...	...	340 feet
Schenectady	...	...	...	...	...	...	246 "
Amsterdam	...	...	...	...	...	...	279 "
Little Falls	...	...	...	...	...	...	376 "
Utica	...	...	...	...	...	...	410 "
Rome	...	...	...	...	...	...	445 "

From Utica to Syracuse, 53 miles, the Erie canal traverses a single level. From Syracuse to Rochester, 81 miles, the uniformity is nearly as noteworthy. From Rochester to Buffalo, a gentle swell is passed at Batavia at a little above 800 feet. This is, by this route, the highest point between New York and Chicago, or between New York and points far beyond the Mississippi river.

It shall be our aim to see now, first, how the valley was made—in other words, to follow the lines of its physical history ; and, second, to see of what importance this gateway has been in the historical development of the empire state, and of the entire country.

We recur to the general fact concerning the geology of the states bordering the Laurentian lakes on the south, namely, that the Palæozoic beds, from the Cambrian to the summit of the Devonian, dip very gently southward from the pre-Palæozoic terranes of Canada and the Adirondacks. Their strikes may be said to represent the position of an old shore-line that was receding southward by the processes of deposition and uplift. The ancient streams must have had their sources on the northern crystalline highlands, have crossed the growing belt of Palæozoic lands, and emptied their waters into the interior sea then covering the coal-areas of Pennsylvania and other states. At an undetermined, but early time, the great St. Lawrence valley, including that of the lakes, was formed, approximately along the northern border of the Palæozoic, but swinging northward of the pre-Palæozoic Adirondack mass. Thus a great body of waters coming from the north was diverted to the east.

The majority of American physiographers who have given attention to the subject, believe that the entire Appalachian belt, from Southern New England nearly to the Gulf of Mexico, was in Cretaceous time reduced to a pene-plain, or nearly to base-level, and that in Tertiary time this body of land was elevated, with warping, to plateau levels of

one to several thousand feet. The New York part of the plateau was lifted from 2000 to 3000 feet. During this uplift, it is believed that the valley of the Hudson was in process of excavation. The St. Lawrence was probably earlier in origin. But the streams from the southern Adirondacks were still discharging across central and southern New York, and reaching the sea through an ancient Susquehanna river. The map will show the alignment of these Adirondack waters with the headwaters of the present Susquehanna.

Given now a growing Hudson valley, and outcrops of the soft Utica and Hudson river shales along the southern base of the Adirondack mountains, it was inevitable that a river valley should be excavated along this line from near Albany westward. The headwaters of the young Mohawk ate back into the country to the west, diverting the Adirondack waters to the eastward, and beheading the south-flowing streams of the plateau of Central New York. This headwater cutting proceeded as far as Little Falls, where it was stopped by a barrier of the ancient gneisses, which in very ancient times was faulted up across the line where the valley was later to run. By a process entirely similar, a valley headed back to the east from the ancient St. Lawrence, diverting thither the streams of the south-western Adirondacks, and beheading other Susquehanna head-streams. The col remained at Little Falls until the close of glacial time. Then great discharges of water were sent across the col to the ocean, by way of the Mohawk and Hudson. This resulted in reducing the height of the col by a considerable measure. A further effect of the glacial waters was to aggrade the valley between Little Falls and Rome to such a degree that the divide was transferred from the former to the latter point.

The glacial history of the valley has proved of such large interest in American pleistocene geology as to warrant a further sketch of it. No chapter in our glacial studies has had a more dramatic interest than the formation in the Laurentian and Red river basins of vast glacial lakes, lying, as most believe, between the divide on the south, and glacial dams formed by the retreating ice-front on the north-east. Lake Agassiz has been worked out by Mr. Warren Upham, under the auspices of the Canadian and United States Surveys. Mr. G. K. Gilbert, Dr. J. W. Spencer, Mr. F. B. Taylor, and others, have studied the Laurentian glacial lakes. One of the greatest of these was Lake Warren, stretching from New York far westward, and discharging into the Mississippi basin. The shore-lines of this lake have an altitude of 870 feet in Western New York. Later the Mohawk valley was freed from ice and the discharge turned to the eastward. Prof. H. L. Fairchild has traced for some distance in Western New York the beach of another great lake, at an altitude of 700 feet. Studies by the writer point to another water-level at about 600 feet, with discharge through the Mohawk valley. The principal evidence of this is found in a number of great deltas and

delta-like terraces built into the valley at the mouths of lateral streams, from above Rome to Little Falls. Striking evidences of eastward-flowing

waters have been studied by Mr. Gilbert and others, south of Syracuse, N.Y., where cross-channels dissect the spurs of the plateau, and great

amphitheatres, cut to depths of 200 feet in the limestone, show the presence, in closing glacial times, of cataracts almost rivalling Niagara.

The Mohawk valley had thus had a long and intricate physical history. Largely cut out in Tertiary days, it remained for the events of the Ice Age to give it a great accession to its headwaters, and to remodel its topography by glacial erosion and accumulations. We are now prepared to study the valley in its relation to man. This record goes back but about three hundred years, but, brief as it is, it has been deeply significant in American history. While holding heartily that geography is the study of the Earth as the environment of man, it is a doctrine equally sure in the mind of the writer, that a knowledge of the origin of geographical forms must accompany historical and sociological study. The military and commercial significance of the Mohawk valley cannot be fully appreciated until seen against the background of the millions of years of physiographic development.

The first European explorers and settlers in the region now known as the state of New York, found established there several powerful Indian tribes, known as the Confederacy of the Five Nations. They occupied the region which extends from the Mohawk valley eastward. Northward is Lake Ontario, westward are the Genesee country and Niagara, and on the south lies the fine series of Finger lakes. It is a country moderately diversified, highly fertile, and is now one of the garden spots of the United States. This was the famous "Long House" of the Five Nations. The Mohawks were the most easterly of the tribes, and they called their fair valley the eastern gateway of the Long House, and they were its keepers. These tribes were in a comparatively advanced state. They practised agriculture extensively, lived in neat and comfortable cabins, possessed considerable industrial skill, were eloquent in public counsel, and were the objects of widespread fear through their prowess in war.

With these sturdy aborigines the European immigrants found themselves in alliance or at war. One avenue of approach was by ascent of the Hudson river. A second was through the Champlain valley from the St. Lawrence. A third lay along the eastern shore of Lake Ontario by the site of Oswego. Thus from the first the rippling waters and bordering flood plains of the Mohawk were a beaten path, frequented by French, Dutch, and English in various contact of war and peace with the natives of the land.

Of these the French were the first to invade the Mohawk country. Not far away, at Ticonderoga, Champlain, the first white actor on this stage, had aided the Hurons against the Five Nations, and had thus, by the enmity aroused, determined for the English the ultimate control of the region. A later invasion was made by the French along the shore of Lake Ontario, but they were defeated and forced to retire. There were peaceful invasions, also, for in the valley captive missionaries

endured torture and sometimes death. Most heroic and famous of these is Father Jogue, whose fate has recently been commemorated by a shrine of his church, erected where he perished, on the edge of a glacial terrace south of the river. The final failure of the French to dislodge or convert the natives of the valley was fraught with weighty results in the history of the new continent. Had they won this great highway, they might in later years have maintained themselves on the St. Lawrence, and have held the keys of the new world.

It was the Hudson-Mohawk valley which early guided the Dutch in their effort to carve a slice from the new continent. Under an English commander, Hendrick Hudson, they sailed up the river which bears his name. Coming to the limit of navigation, they built Fort Nassau, below the site of Albany, and concluded a treaty with the Mohawk Indians. Its object was trade, and it went far to prevent French control of the valley. They built Fort Orange in 1622, and thus laid the foundations of Albany. In 1642 Arendt van Curler entered the Mohawk country, reported its lands as "the most beautiful that eye ever saw," and was later authorized to buy the "great flats" where Schenectady now stands. The old town and family names of the lower Mohawk still bear proud testimony to this wave of immigration, in the ever-present Fondas, Schuylers, Sprakers, Sammonsens, Van der Veers, and Yosts of the river country.

The first white settlement in the upper stretches of the valley was made by the Palatines in 1723. Following the devastating wars of Louis XIV., thousands of these stricken people left their homes on the Rhine and took refuge in England. Some of these were sent to America, under a compact to reimburse the English Government for their passage, and for the allotment of lands. After a period of great suffering, first on the Hudson and then on the lower Mohawk, a final removal brought them to the German Flats Patent, between Little Falls and Utica. Here each family received a liberal allowance of the rich alluvium and adjacent uplands of the valley, and their descendants have been powerful in the history of the state and nation.

The next wave of immigration which swept up the valley was English. In 1784, Hugh White passed the Hollanders of Schenectady and the High Dutch of German Flats, and founded Whitestown on the upper river. His coming was the signal for a lively movement from the stony slopes of New England to the inviting fields of the Long House, to which the Mohawk was the only road. Then came the stream of emigrant waggons bearing the names of Ohio and Indiana, regions which were then the far distant West.

This stream of travel has never ceased to flow, but has rather augmented a thousand times in the century which has passed. Before considering the Mohawk valley as a highway, however, it will be well to observe that it was the theatre of important military events in

colonial times. English forts had been erected on the upper Hudson by the year 1709, and before the year 1712 the chain had been extended up the Mohawk to Fort Hunter, 40 miles from Albany. In 1720, through the influence of William Burnet, son of Bishop Burnet, and Governor of New York, forts were built at Oswego and farther west at Irondequoit bay. About the time of the French war a number were built near the present city of Rome, or in the vicinity of the Oneida carrying-place. "These and similar efforts on the part of the English served to divert from the French into English channels a large Indian trade, and to make the route *viâ* Mohawk river and Oneida lake the shorter one between Albany and Canada, the one most generally travelled." The Mohawk and Champlain became thus great highways trodden by hostile forces in the French and Indian wars, until the French rule came to its end in Canada in 1760. Local histories are filled with exciting records of midnight attack, weary marches in captivity, and all the terrors of border warfare. Here, too, was fought one of the less-known but most critical battles in the struggle between the colonies and the mother-country, the battle of Oriskany. On the south slope of the valley, a few miles west of Utica, the Dutch farmers rallied under Nicholas Herkimer, and defeated the English and the Indians, who would otherwise have gone down the valley and supported Burgoyne in his campaign on the Hudson. The combatants on each side numbered but a few hundreds, but the result is thought by many to have been decisive of the main issue of the war. Since that day the history of the valley has been an unbroken story of peace, and to this we now turn, to consider one of the best illustrations of physiographic control over the movements of man which the New World can supply.

In the pioneer days the Mohawk was considered a navigable stream, and immigrants and freight were conveyed over its waters in boats propelled by poles. Several breaks were, however, necessary—a first beyond Albany, because of the abrupt fall of 70 feet at Cohoes; a second at Little Falls on account of impassable rapids over the gneissic barrier which the stream there encounters; and a third of 2 miles at the Oneida carrying-place, where the Mohawk is left to the east, and the winding course of Wood creek is followed to Oneida lake. Early legislative authority was given for improving navigation at these points, and soon after 1791 a canal 3 miles long with five locks was constructed at Little Falls, and a further canal conducted boats across the Oneida carrying-place. We read that then enlarged boats with five men could transport, between the terminal points of navigation on the river, twelve tons in ten days. Long lines of waggons and stages also traversed the bottom lands, making the valley a busy highway between the east and the expanding west.

A continuous waterway from the tidal waters of the Hudson to the

blue expanse of the Laurentian lakes became now the subject of serious discussion. Enough of the geography was known to suggest the possibility of such communication, but the following order issued to a commander on Lake Ontario in 1814 shows also the extent of the ignorance that prevailed. "Take the *Lady of the Lake* and proceed to Onondaga, and take in at Nicholas Mickle's furnace a load of ball and shot, and proceed at once to Buffalo." "That means," said the perplexed officer, "that I am to go over Oswego falls and up the river to Onondaga lake, thence 10 miles into the country by land to the furnace, and, returning to Oswego, proceed to the Niagara and up and over Niagara falls to Buffalo."

The demand for a water-route was strengthened by the danger that the growing commerce of the Genesee country would be diverted either down the St. Lawrence to Montreal and Quebec, or by the Susquehanna to Philadelphia. It is difficult to assign credit for the first suggestion of an Erie canal. Probably the idea was conceived independently in several thoughtful minds. Such a prediction is said to have been made by Captain Joseph Carver in 1776. Elkanah Watson, describing a westward journey in 1788, voiced his "strong presentment that a canal communication will be opened sooner or later from the Great Lakes to the Hudson." Gouverneur Morris is reported to have said in 1803, "Lake Erie must be tapped, and the waters carried across the country to the Hudson." He thought there should be a uniform declivity between the two, not taking account of the height of land in Western New York. The legislature took up the matter in 1808, a survey was made, and in 1810 a commission was appointed. The project then fell into abeyance, until revived by De Witt Clinton in 1817. Navigation was finally opened between Lake Erie and the Hudson on October 26, 1825. The price of transportation from Albany to Buffalo, about 300 miles, gradually declined during the twenty-six years after the opening of the canal, from \$88 to \$5.98 per ton. Later, railway competition became effective, and transportation from Buffalo to New York in 1885 was but \$1.57 per ton. Of the vicinity of Rochester, it is said, upon completion of the canal, that her timber found market and floated away, wheat quadrupled in price, the mud dried up, the mosquitoes, the ague and fever, and the bears left the country, and prosperity came in on every hand. In like manner, the salt, gypsum, lime, and grain of Onondaga, where is now the great city of Syracuse, found ready market. But it is not enough to cite these comparatively local results. The meaning of the Mohawk valley is that the entire region of the Great Lakes, and the vast prairie and mountain regions of the West, became tributary to the rising metropolis on Manhattan island. Hence it is that New York, rather than Boston or Philadelphia, or Baltimore, is the metropolis of the Western Hemisphere.

A similar story has now to be told of railway communication through

this valley. There was no railroad in America prior to 1826. In that year a horse-railway 4 miles long was built at Quincy, Mass., for the transportation of granites from the quarries. In the same year the legislature of the state of New York granted a charter to the Mohawk and Hudson River Railway Company to build a road from Albany, on the Hudson, to Schenectady, on the Mohawk, a distance of 18 miles. This was the first chartered railroad in America. It was completed October 31, 1826, and at once carried four hundred passengers daily. This, it will be remembered, was soon after through traffic began on the Erie canal. In 1833 a charter was granted for a road to extend from Schenectady up the river to Utica, a distance of nearly 80 miles. This division was in running order in 1836. A further link in the westward series between Syracuse and Auburn was finished in 1837, and from Utica to Syracuse in 1839. A curious argument was urged for a break in the chain of roads at Utica, namely, that otherwise it would become a mere way station on a great line, and its business would fail to develop. The discussion shows that the consolidation of the future was forecast at an early time. Gradually the line was completed from New York to Buffalo, 450 miles, and became known as the New York Central and Hudson River railway, or more commonly as the New York Central, one of the greatest railways of the world. Four tracks lie side by side from Albany to Buffalo, two being used for passenger traffic, and two for the conveyance of freight. Owing to the abrupt descent of the valley slopes to the river, but two tracks lead from Albany down to New York. The seaboard terminal is New York with its three millions of people, and an adjacent suburban population in New Jersey of more than a million. At the western terminal is Buffalo, the eastern goal of lake navigation, with nearly four hundred thousand people. On the line are Rochester, Syracuse, Utica, and Albany, nearly a score of smaller cities and innumerable busy towns. A great number of minor railways pour their tribute into this great artery of transportation, and it is hardly true to call Buffalo a terminal point, since many solid trains each day push on without change both south of the lakes and across Niagara, through the dominions of Her Majesty the Queen, 500 miles further, to Chicago. There is not a difficult grade or an embankment or trestle of any importance between New York and Buffalo, and with slight exception this holds good from Buffalo to the Rocky mountains. Two thousand miles of splendid country are thus made tributary to the harbour of New York through the river gateway which we have described. About twenty years ago a competing line with two tracks was constructed, and called the West Shore railway. It extends up the Hudson on the west side, along the Mohawk on the south side, and thence closely parallel to the Central railway to Buffalo. For the most part the same towns are served by the two lines, and the newer has now become an integral part of the older system, so that the

New York Central virtually crosses the empire state with a line of six parallel tracks. It should be added that the second telegraph line in America joined Albany and Utica along the Mohawk valley, being finished on January 31, 1846. A short line between Baltimore and Washington preceded it by two years.

To sum up, the valley is now threaded by the ancient highways, the Erie canal, six railway tracks, and innumerable telegraphs and long-distance telephones, by which New York converses with Detroit, Indianapolis, Chicago, and other western cities. The passing up and down—day and night—of men, of thoughts, of commodities, is like the ebb and flow of tidal waves whose course is only stayed as traffic rests on the docks of Europe and of more distant continents.

But it must not be thought the Mohawk is the only road which has been sought out to the West. It is only a broader gate with a lower threshold. There are other great railways, but none of them passes the Appalachian belt at an altitude of 445 feet. A brief comparison will be instructive. Take first the roads which traverse the empire state from the seaboard. Much English capital was vested in the Erie railway. Perhaps the flow of money would have been less free had its sinuosity and heavy grades been known. At 75 miles from New York it must attain a height of 870 feet to pass the Kittatinny mountains. At Port Jervis the altitude is 442 feet; at Deposit, 1008 feet; near Elmira, 799 feet; and at Castile, 1401 feet, with some large embankments and difficult bridges. Likewise the New York, Ontario, and Western railway, running to Oswego and the west, crosses difficult divides, and rises and falls between low altitudes and maxima of nearly 1800 feet. The Delaware, Lackawanna, and Western railway rises to 1932 feet at Tobyhanna Pa, and in 27 miles descends to 745 feet at Scranton. Thence it passes into New York, where it varies between 846 feet and 1359 feet.

Of the roads which cross the Appalachians south of New York, the conditions are similar. The Lehigh Valley road from Philadelphia maintains a course below 700 feet for 100 miles; then in 30 miles climbs to its summit, 1728 feet; and in 20 miles more drops to 549 feet at Wilkes-barre. The Pennsylvania, one of the finest roads in America, is obliged to make at one point an altitude of 2161 feet, and has one section of 5 miles whose grade is 80 feet per mile. The Baltimore and Ohio road, still farther to the south, has its summit at 2620 feet. Farther south the facts are yet more striking, and it is less than twenty years since a railway first crossed the southern Appalachians. The early hunters and settlers who entered Kentucky and Ohio from Virginia and the Carolinas, sought the high and difficult passes of the mountain and forest, crossing, so to speak, the grain of the country, while along the Mohawk the Dutch and English walked in as by an open door.

In conclusion, let us return to the winding waters and fertile flood-grounds of the Mohawk. After its sources leave the high hills of

Central New York, it follows from Rome to the Hudson, a short course of 110 miles. Upon its banks are six cities, all good illustrations of physiographical control. Rome, with 15,000 people, is built at the Oneida carrying-place; Utica, a thriving city of 60,000 souls, is determined by an old fording-place, and receives tribute from Central New York through a number of lateral valleys. Little Falls, a small but busy city, depends upon an ancient carrying-place and its water-power, the primal cause being an extensive fault which here crosses the river from north to south. Farther down is Amsterdam, a city of 20,000, and a great centre of knit goods and carpet manufacture. Schenectady, with 25,000 people, lies on the great flats, where the river issues from the uplands upon the old estuary ground of the Hudson, as it was in a time of continental depression. The last is Cohoes, a city of looms, whose superb water-power is due to the falls of the Mohawk, just before it enters the Hudson. The lower Mohawk was thrown out of its course by the events of glacial time, and discovered the ledge over which it descends. Nine towns of 2000 to 5000 population are also scattered along the river, with many smaller villages; while the stretches of alluvial field, backed by rising meadows and forests, offer scenes of greatest beauty.

The writer has seen the valley from every point of view, has lived in it, and gone up and down its course for many years, and scarcely knows whether to delight more in its physiographical history, its simple rural charm, or in the thronging life which marks it as one of the greatest highways of the world.

DELIMITATION OF THE BRITISH AND FRENCH SPHERES IN CENTRAL AFRICA.

By the agreement arrived at between Great Britain and France, the terms of which are embodied in the Declaration signed in London on March 21 last, one of the most thorny questions connected with the partition of Africa has at last received a satisfactory solution. Taken in conjunction with the Convention of June, 1898, to which it is regarded as an addition, the agreement completes the delimitation, in principle if not in detail, of the entire spheres of the two powers in Central and West Africa, and at the same time removes the last important area of debatable ground from the map of the whole continent.

The region lately in dispute forms, as it were, the central core of the African continent, on which the forces of civilization have been gradually converging from north, east, and west. As guardian of Egypt, and also in virtue of her protectorate on the headwaters of the Nile, Great Britain has since 1890, when the claim was first definitely made in the Anglo-German agreement of that year, sought to retain within