ing an area of about 92,000 square miles. This central valley is not entirely devoid of mountains; but these higher areas are so small in extent, as compared with the entire area of the great valley, as to be of extremely subordinate importance. Meanwhile we turn to a consideration of the higher regions east and west of the great valley.

Neither on the eastern nor on the western side of the continent are these of the nature of simple mountain chains. On the contrary, both eastern and western highlands are complicated in their oro­graphic structure, broken into portions, each having a character of its own, and generally—but not always—preserving a certain parallelism with each other, broken longitudinally or in the direc­tion of the prevailing trend of the elevated mass, and separated by valleys and tablelands of very varying dimensions. The western mass, which is much the larger, is also very much the more com­plicated of the two. It is not only made up of a great number of parts more or less distinctly separated from each other, but it even encloses a large area of plains, valleys, and mountain ranges which have no drainage to the sea. This greatly predominating complexity of the western elevated region is the result of complicated geologi­cal conditions, to which are added climatic peculiarities of a striking character. The eastern elevated side of the continent is now gene­rally called the Appalachian region, the western the Cordilleran.

*The Appalachian System.*

The Appalachian ranges all belong to an ancient system of uplift or disturbance, and have not been invaded by volcanic materials of recent date, presenting in both these respects a most marked contrast to the Cordilleran system. There are volcanic rocks along portions of the eastern slope of the Appalachians ; but these eruptive dikes and overflows are not of Tertiary and post-Tertiary but of Mesozoic age.

The name Appalachian is used as designating the entire complex of ranges, valleys, and tablelands in and upon which is situated the watershed from which on the north and east the streams descend to the Atlantic, either directly or through the Great Lakes, and on the west and south-west to the Gulf of Mexico, either as tributaries to the Mississippi or flowing directly to the Gulf. As thus defined, the Appalachian region, system, or complex of ranges extends from the promontory of Gaspe, in a mean direction of north-east and south-west, to Alabama, a distance of about 1300 miles, where it disappears under the much more recent geological formations which form a broad belt along the Gulf of Mexico and extend far up the Mississippi valley.@@1

While the Appalachian system, as a whole, is so nearly continu­ous, as a feature of the topography of the country, that it seems necessary to include it all under one general designation, yet dif­ferent portions are extremely unlike each other in some of those features which are generally looked upon as essential to the unity of a mountain system.

One very marked and important break at least in the system is that occupied by the Hudson river, and extending up the Mohawk valley to the west, to a connexion with the Great Lakes, and up the Champlain valley to the north, to a connexion with the St Lawrence river direct. A rise of 152 feet in the sea-level would isolate from the rest of the continent all of New England and that part of Canada lying to the south-east of the St Lawrence, as far as the extremity of Gaspe. A further rise of 278 feet would open a waterway from the Atlantic to the Great Lakes, and leave the mass of the Adirondacks as an island lying adjacent to New England on the east and the Appalachian land-mass on the south. We seek in vain for any other break in the Appalachian system as complete as this, and, when we compare the portions of the system lying on each side of this line of division, we recognize the fact that there are essential points in which they differ from each other, and that these differences are greater than any pre­sented by the various portions of the system in its extension to the south-west of the Hudson river break. This north-eastern division of the Appalachians may therefore properly first have its more important topographical and geological features indicated.

Beginning with the division west of Lake Champlain and north

of the Mohawk valley—the Adirondack region or mountains,— we find, on examination, that this region is not only to a certain extent isolated topographically from the rest of the Appalachian ranges, but that it belongs to a geologically older system.@@2 The rocks are all eruptive in the central portion of the mass, and chiefly gabbro and granitic or gneissoid in character. On the exterior, especially on the eastern edge, are deposits of limestone, which are generally believed by geologists to be sedimentary beds, highly metamorphosed, but which, in the opinion of the present writer, are more probably of the nature of chemical precipitates.

The drainage of this region is radial from a central point, but the slope on the east is shorter than on any of the other sides. From Tahawas or Mount Marcy (5344 feet) the drainage is to the north-east by the Au Sable to Lake Champlain, by the Raquette to the St Lawrence, and by the branches forming the head waters of the Hudson to the south. The dominating line of elevations runs nearly east and west, with high spurs and narrow ridges on the north, of which Whiteface Mountain (4871 feet) is one of the most conspicuous. The region is one of numerous lakes and lake-like expansions of the rivers, so that, with short portages, a large part of it can be visited by boat or canoe. The lake region proper of the Adirondacks lies at an elevation of from 1500 to 2000 feet:—Lake Silver, 1983 feet; Placid, 1950; Saranac (Upper), 1606, (Lower), 1557 ; Smith’s, 1738 ; Tupper’s, 1504 ; Long, 1584 ; Raquette, 1765 ; Sandford, 1685 ; Cranberry, 1570. There are indications of the Appalachian trend in the north-east south-west direction of several of the larger lakes ; but many others trend nearly north and south. The number of the lakes is the result of the impermeability of the rock, the general uniformity in height of the region, and the broken character of the surface, which is very irregularly covered by large masses of rolled detritus. The work of water is every where distinctly visible, and that of ice hardly perceptible.

The mountainous region east of the Hudson in New England is the portion of the system most irregular in topographical features. Two groups of elevations, however, are quite well marked, and have distinctive names—the Green- and the White Mountains. These are separated by the Connecticut river, which has a nearly north and south course parallel to the range of the Green Mountains. Nowhere in this latter range is there a continuous uplift forming a long ridge or crest, but there is a gentle swell of the surface on which here and there rise elongated groups of considerably higher summits. In the extreme south­western corner of Massachusetts rises Bald Peak (2624 feet), and in the north-western corner Graylock or Saddle Mountain (3505 feet). Still farther north, in Vermont, are the culminating points of the Green Mountain range :—Equinox, 3872 feet ; Pico, 3935 ; Camel’s Hump, 4077 ; Killington, 4221 ; and Mansfield, 4389 feet. As­cutney, a quite isolated point, near the Connecticut river, has an altitude of 3163 feet.

The Connecticut river makes a very complete separation, in all but the extreme northern portion of its course, between the Green Mountain system and the highlands to the east, which have no col­lective name, but are in a measure the continuation of the White Mountain range. In Massachusetts this swell of land—for more it can hardly be called—has an elevation of about 1000 feet, the valleys being rarely sunk more than 200 or 300 feet below the general level of the gently undulating higher lands. Occasionally there is a higher point, like Wachusett (2018 feet) or Monadnock (3169 feet). From Monadnock the region east of the Connecticut broadens very much, the coast-line trending rapidly eastward. The country becomes more and more mountainous, but still without continuous ranges. The mountains are grouped around various central points, of which the most important are Moosilauke or Moosehillock (4790 feet), Lafayette (5290), and Washington (6290 feet). The last-named is the highest point in the Appalachian system north of North Carolina, and rises nearly 500 feet above all the adjacent summits.

Farther east, in Maine, and in the neighbouring portions of Canada, the topography has been little worked out in detail. So far as known, in Maine the irregularity of the range is still greater than it is farther to the south-west. There is in this part of New England no coast-region, but a gradual rise from the seashore towards the interior for about 140 miles, to the divido between the waters running into the Atlantic directly and those tributary to the St Lawrence or forming the head of the St John. This divide, which has a general direction of pretty nearly east and west, is at an alti­tude of about 1800 feet at the western edge of Maine, and declines to about 600 feet on its eastern boundary. The southern slope is a very gradual one to the sea, and though broken and rocky is not diversified by any marked ridges or long elevations. The high points rise sometimes nearly isolated, and sometimes in clusters, having little of the ridge character. Ktaadn (Katahdin) is the

@@@1 The first person to describe topographically the Appalachian system as a whole was Guyot, who, in 1861, published the results of several years’ work among these mountains, giving the heights of numerous points obtained by the aid of the barometer, accompanied by generalizations in regard to the orography of the region, and a map (1:6,000,000), which was first published in *Petermann's Mittheilungen* (1860). The various geological surveys carried on by the States included in the Appalachian region have furnished a large mass of material both geographical and geological in regard to portions of the range ; but, since this work has not, as a rule, been based on accurate topographical maps, most of it is rather of the nature of a reconnaissance than of a finished survey. The State of New Jersey is, however, publishing a map based on an accurate triangula­tion, but on a small scale (1: 63,360). The first and second geological surveys of Pennsylvania have also done much to extend our knowledge of the topography of the most complicated and interesting portion of the whole Appalachian region, but as we go either south or north from this central region we find the data less and less complete, and in regard to the extreme south-western portion of the Appalachian range we are little if at all in advance of Guyot. What is most lacking at present is an accurate map of that portion of the system which lies to the south of the region embraced within the State of Pennsylvania.

@@@2 The Adirondack region—or Adirondack Wilderness, as it is often called—has been more or less completely covered by a topographical survey made by authority of the State of New York ; it was begun in 1872, but the final results, in the form of a map, have not yet been published.