than saline incrustations resting upon a more or less muddy bottom. In general the valleys are nearly bare of vegetation in their lower portions; higher up they are covered with a growth of desert shrubs. There are, in occasional favoured localities, small sedge­grass meadows. There is a rapid falling off in elevation of the Basin region towards its south-western corner, and here portions are below the sea-level. Death Valley, the sink of the Armagosa river, is one of these depressed regions, and along the line of the Southern Pacific Railroad is another depression, a little over 60 miles in length, the lowest portion of which is 263 feet below the level of the sea. Of the ranges traversing the Great Basin, with a trend approximately north and south, some are short and inconspicuous, while others maintain an almost unbroken crest for 100 miles or more. Their parallelism in certain portions of the Basin is very striking. The loftiest range is that called the East Humboldt—or more frequently simply the Humboldt ; this rises about the middle of the Basin, its southern end being in 115° 30' W. long., and runs north-north-east for about 100 miles to near the head of the Hum­boldt river. At the north end of this range is Mount Bonpland (11,321 feet), the culminating point of the Basin ranges. The Pah-Ute range, about 150 miles west of the Humboldt, is another very persistent line of elevations, although rather irregular in trend, and not very high. The West Humboldt range is also a conspicu­ous one near the western side of the Basin ; its culminating point is Star Peak (9925 feet). The mountain ranges of the Basin are characterized by the almost entire absence of forest vegetation, trees being abundant only in their higher portions in the deeply hidden canons. The rocks are everywhere exposed along the ridges and flanks. The valleys are deeply filled with detrital materials, which rise sometimes along the flanks of the ranges to a very considerable height, with a steep but gradually diminishing slope, indicating the former greater energy of erosive agencies.

The Great Basin is an interesting field for the geologist. The most important feature is the entire absence of the marine Creta­ceous and Tertiary formations, which play such an important part in the Rocky Mountain division. With the exception of the late freshwater Tertiary of the Humboldt river and some of the areas farther west, and of the post-Pliocene detrital accumulations of the valleys, there is nothing more recent than Jurassic, and very little of this, the most recent really important fossiliferous formation being the Alpine Trias. The stratigraphical relations of the forma­tions, especially with reference to the building-up of these ranges, are mostly simple, as in the Appalachian and Jura ranges, or even simpler still. Some ranges are simple monoclinals, others anti- clinals, and others again synclinals, or a combination of two or more of these forms of structure. They are rarely or never closely compressed and only moderately faulted. The striking peculiarities of Appalachian erosion, due in large part to the repetitions of hard and soft strata, are not to be found as important elements in the Great Basin topography. The Basin ranges differ, however, in a marked degree from those of the Appalachian and Jura in the almost constant presence, and sometimes overwhelming importance, of the volcanic masses throughout the whole region. In some instances these formations make up the whole range ; or, at least, the whole interior skeleton of older rocks, if such exist, is concealed by them ; in other cases the eruptive materials have been poured forth along the base of the uplift, and there form great plateau­like masses; or they have issued from the summit of the range and spread themselves there in sheets, or flowed down the flanks of the central mass. In this respect the Basin ranges maintain a unity with the other portions of the Cordilleran system, throughout which the exhibition of the results of volcanic energy during the later geological periods is everywhere manifested on a scale perhaps unequalled elsewhere.

III. The Northern or Columbian plateau embraces the region en­closed between the northern extension of the Rocky Mountains on the east and the Cascade range on the west. It is the basin of the Columbia river, which drains it by means of two principal branches, one of which retains the name Columbia to its source beyond the boundary of the United States, while the other, originally named the Lewis, is now almost universally known as the Snake river. The Columbia itself forks near the boundary line, the main river coming down from the north, and being joined by Clarke’s Fork from the south-east. The Columbia and the Snake, after uniting, flow westward for about 100 miles, before breaking through the Cascade range. This area is the portion of the United States of which we have the least topographical knowledge, and therefore only its more striking features can be indicated. The north­westerly trend of the northern division of the Rocky Mountains reduces the width of the Cordilleran system as we go north, since the Cascade range remains unchanged in its direction from the southern line of Oregon to the northern boundary of the country. The area between the two systems is more or less completely filled with mountains of which little is definitely known. Of these there are two principal groups, the Blue and Salmon River ranges, of which the former lies in the angle made by the Snake in its north­erly course before reaching the Columbia, while the latter forms an intricate mass, extending from the westernmost ridge of the Rocky Mountain system westward towards the Snake.

The Columbia river rises only 100 miles north of the boundary line, but runs nearly 200 miles farther in a north-westerly direction before turning to go south again in a course nearly parallel to that it had before. The Okanagan joins it about 70 miles south of the boundary line and from here the course of the Columbia is southerly, parallel with the Cascade range for about 160 miles to the Great Bend, when the river takes a nearly westerly direc­tion, which it keeps until, after having passed through the range, it reaches the Pacific. All the region lying north and west of the river and between that and the Cascade range is mountainous. The topography is very irregular, but there is a general tendency to a north and south trend, which is still more marked in the region between the Columbia and Clarke’s Fork. Here the ranges on each side of the north-flowing Colville rise to from 5000 to 7000 feet in height.

South of the Columbia is a vast area, extending to the edge of the Great Basin, and enclosed between the Rocky and Cascade Mountains, of which the main feature is that a very large portion is deeply covered by volcanic formations, which here extend over a larger continuous area than anywhere else in the world, with the possible exception of the Deccan in India. This volcanic plateau­like region extends northward into British Columbia and south to near the line of the Central Pacific Railroad in Nevada, from which its dark and frowning walls are visible ; it extends up Snake river valley to the base of the Rocky Mountains, and south-west, through California, into the valley of the Sacramento. Along the Columbia river it unites with the great volcanic mass on which Hood, Adams, and St Helens are built up, and still farther north it merges in the eruptive accumulations which reach their greatest elevation and grandeur in Mount Rainier. These lava masses lie in nearly horizontal beds of varying thickness, interesting in their geological relations, but extremely monotonous from the scenographic point of view. They are often cut deeply into by the streams which in some places have sunk their beds below the general level of the country to the depth of more than 500 feet. These are not infre­quently precipitated over the edges of the volcanic masses in cataracts, which sometimes are extremely picturesque. The falls of the Pelouse river are striking, but those of the Snake river known as the Shoshone Falls are by far the finest, and among the waterfalls of the United States perhaps come next to Niagara in grandeur. On the volcanic plateau are occasional cones, occurring singly or in groups, but much the larger portion of the overflows seem to have taken place in the form of massive eruptions, by which wide areas were covered very uniformly with lava, and ou these nearly horizontal masses the cones have been built up during the dying out of the eruptive agencies. The volcanic rocks cover an area, about the Columbia and its branches, east of the Cascade range, which may be safely estimated at fully 100,000 square miles,—perhaps at considerably more. A large portion of this area was once occupied by bodies of fresh water, the deposits from which, in the form of sands and clays, have been exposed by erosion in various places, and are found to be rich in remains of land and aquatic animals, mostly of late Tertiary age. A considerable number of lakes still occupy portions of the surface, and an exten­sive group of these, some of which are of large size, although shal­low, occupies a corner of Oregon, and an adjacent part of California, east of the Cascade range. Much of the surface is dry and barren. The valleys along the river courses are in many places well adapted for cultivation ; but these fertile areas are of comparatively small extent. The mountain ranges around the bases and over the lower portions of which the volcanic materials have been deposited appear to resemble, lithologically and geologically, the rocks of the Sierra Nevada. In the Owyhee Mountains there is a central core of granite, on which rest metamorphic slates and sandstones, forming a belt 20 miles wide on the south-western side of the range, and half as much on the other side. In the granitic axis are numerous veins of quartz, carrying free gold and ores of silver. With the exception of occasional hot springs, volcanic activity seems to be extinct, or at least to have been for some time dormant. There seems to have been, about the close of the Tertiary epoch, a period of extraordinary volcanic activity throughout the Sierra Nevada and Cascade ranges, and over a vast extent of country to the east. It does not appear, however, that there has been during the post­Tertiary times any eruption of fluid lava which would harden into solid rock on cooling.

IV. Enclosed between the ranges of the Rocky Mountains on the east and the Sierra Nevada on the west there are—as has been seen —numerous high plateau-like districts, the beds of old freshwater lakes, some of which were of large dimensions. The strata deposited at the bottom of these lakes have been cut into by erosive agencies in numerous places, so that the geological structure stands fully re­vealed, while the wealth of organic remains which they contain has made these old lake-beds wonderfully attractive to palaeontologists. The drainage, desiccation, and subsequent erosion of these areas have given rise to a remarkable type of scenery, to which the name of