lower carboniferous. They also state, that if the great contortions and strike of the Rhenish provinces were produced contemporaneously with those of the Hartz, then the great derangement of the Hartz must have taken place after the deposit of Belgian and Westphalian coal-fields, but before the accumulation of the red conglomerates, sandstones, coal-beds and trappean masses on its eastern flank. Hence the authors infer, that none of these red conglomerates are of the date of the old red sandstone; and that the coal-beds belong to the highest part of the carboniferous series, where it passes into the new-red sandstone.

Lastly, they describe a hasty traverse from the Thuringerwald through the forest of Upper Franconia, and thence to the north flank of the Fichtelgebirge. On the northern limits of the section are rocks with a true slaty cleavage, which might be compared with the upper slates of the Ardennes. Farther south, the analogy was confirmed by bands of limestone with stems of encrinites; still farther south occur impressions of plants; and the whole system appears to be finally overlaid by a series of limestones and schists, some of which are very rich in fossils. The lowest of these zones of limestone rests on calcareous slates, containing a Cardiola of the upper Ludlow rock. In this zone the species of Clymenia are most abundant; Goniatites and Orthocera are numerous in a higher zone; and the series is overlaid by a limestone containing many true carboniferous shells. From these facts, the authors are convinced that the fossilliferous region near Hoff belongs to the Devonian system, with the exception of the highest beds, which are carboniferous.

Such are the results arrived at by the authors; and they seem to be in general accordance with one another, and to bear out the classification proposed for the older British formations.

June 10.—Rev. Dr. Buckland, President, in the chair. Various communications were read.

1. A notice by the Rev. D. Williams, of an intrusive mass of trap in the mountain limestone at the western extremity of Bleadon Hill, and laid open by the excavations for the Bristol and Exeter Railway. This is the first discovery of trap in the line of the Mendip Hills; and the only igneous rock hitherto detected in Somersetshire, with the exception of the syenite of Hestercombe, north of Taunton, described by Mr. Horner, and a slaty porphyry observed by Mr. Williams, a little north of Simmons-birth, in Exmoor.

2. A Memoir descriptive of a series of coloured sections of the cuttings on the Birmingham and Gloucester Railway, by Mr. H. E. Strickland.—The author commences by regretting that geologists have not availed themselves more extensively of the opportunities afforded during the progress of the different railways, and by dwelling on the advantages which would have accrued, had a geologist been permanently attached to each line. He then states that his memoir originated in a request by Capt. Moorsom, to undertake an examination of the Birmingham and Gloucester Railway; and he expresses his great obligations to that gentleman and to Capt. J. Vetch, for the valuable assistance which they afforded him. This line was also surveyed during the first operations, and before the cuttings were commenced, by Mr. F. Burr; and the report which was made by him to the Society (*Athen.* No. 540) is very favourably noticed by Mr. Strickland. The formations intersected by the railway, are the new red sandstone with the red marl, lias, and superficial deposits; and the fullest details are given both of their composition and attendant phenomena. The new red sandstone and marl afforded no additional features deserving of particular notice. The junction beds of the red marl and lias are well displayed at Dunhamstead, and consist in descending order of lias clay with contorted beds of lias limestone—white micaceous sandstone 2 feet, lias clay 6 feet, grey marl 35 feet, red marl. A similar section is exposed at Norton. The fossils of the lowest beds of the lias are stated to differ essentially from those which occur in a higher series of strata at Bredon; and those again to be distinct from the fossils in the neighbourhood of Cheltenham. At Hewletts, east of that town, the lias near the base of the marlstone presents another series of peculiar fossils; so that, adds Mr. Strickland, in the lower lias there are at least four well marked successions of molluscous animals ranging through a vertical height of 400 or 500 feet, and unaccompanied by any change in the mineral character of the deposit. The superficial accumulations, or detritus, received a very minute examination; and the author states, that the cuttings have fully confirmed his previous views respecting the origin of these deposits. He divides them into fluviatile and marine; and the latter, according to its origin, into local and erratic; and the last again, according to its composition, into gravel, with flints, and without flints,—the latter being destitute of mammalian remains. The marine erratic gravel without flints occurs extensively around Birmingham; at Mosely, on the line of the railway, it is upwards of 80 feet thick: the ridge of the Lickey is covered with considerable accumulations of it; and at Sugar's Brook, as well as to the east of Abbot's Wood, are other beds of this gravel. The marine erratic gravel with flints commences where the railway crosses the Avon, abounding in the neighbourhood of Bredon. It is stated to be without mammalian remains. The fluviatile gravel occurs only on the two flanks of the Avon, at Defford and Eckington: it abounds with mammalian remains, and is overlaid by ten feet of gravel, precisely similar to the marine erratic gravel of Bredon. The most abundant shells found in this deposit, are *Cyclas amnica* and *C. cornea*; and the bones are referable to *Elephas primigenius*, *Hippopotamus major*, *Bos urus*, and *Cervus giganteus*; also *Rhinoceros tichorhinus*. In endeavouring to account for the presence of bones and freshwater shells at this locality only, Mr. Strickland repeats his former explanation, namely, that after the beds of marine gravel had been deposited, and been laid dry by the elevation of the land, a large river or chain of lakes extended down the valley of the Avon; and that the marine gravel having been remodified by the fluviatile current, was mixed up with remains of mammalia and mollusca, which tenanted its banks or its waters. Local gravel occurs abundantly at Cheltenham, and is composed of lias and oolite detritus. No terrestrial remains have been noticed in it; and it is therefore referred by Mr. Strickland to a marine origin.—Modern alluvia: The only deposits belonging to this class on the line of the railway, are the peaty accumulations on the banks of the Avon and its tributaries. The memoir was accompanied by a copy of the engineer's sections, coloured geologically by the author, who, in conclusion, expresses a hope that the time is not far distant when the Society may possess a set of coloured sections of every railway in the kingdom.

3. A letter addressed to Mr. Murchison by Capt. Lloyd, on the occurrence of Coral Rocks in the Mauritius, at a considerable distance from the shore, and at heights varying from 10 to 25 feet.—The Mauritius is belted by an enormous coral reef throughout its whole circumference, except for about ten miles along the extreme southern side, where the coast is bold, and consists of basalt. Two of the masses of coral-rock described by Capt. Lloyd, are situated in the valley of Petite Savanne, and form remarkable points or headlands, from 20 to 25 feet above the present level of the sea; and they present the same marks of abrasion as the existing barrier reef. The Observatory, Port Louis, is built also on a stratum of very hard coral rock, ten feet above the level of the sea. There are besides in several parts of the island enormous blocks of coral surrounded by the debris of oysters and other shells and corals. Appended to the letter are communications from Mr. Hill and Mr. Sherlock, agents employed by Capt. Lloyd, containing measurements of blocks near Souillac and on the Black River.

4. A notice on the mineral veins of the Sierra Almagrera, in the province of Almeria, Spain, by Mr. Lambert.—The Sierra Almagrera is exclusively composed of clay slate. The first discovered vein, the Barranco Jaroso, is rich, and has been excavated more than 200 yards in length in a direction of north to south between an hour and an hour and a half of the compass, the inclination being from 65° to 70° east. It commenced with half a yard at the surface, and has increased to three yards, at a depth of forty yards. Its mineral contents are arranged in parallel divisions and consist of different varieties of galena, carbonate of lead, argillaceous iron ore, carbonate of iron, carbonate of copper, sulphate of barytes and gypsum. Old workings, supposed to have been conducted by the Romans, occur in great numbers principally at the mouths of the ravines. Upon the edges of the Sierra reposes a tertiary formation, constituting the bed of the river Almanzora, and extending to the Sierras Cabrera, Alhamilla, and Filabres. The upper portion consists of an arenaceous conglomerate, alternating with marls, gypseous clays, and sand, and contains numerous organic remains. The formation is stated to have been greatly disturbed by trap rocks.

5. Notice on the Sierra de Gador and its Lead Mines, by Mr. Lambert.—The Sierra de Gador, well known for its rich lead mines, is situated between the Sierra Nevada and the Mediterranean, extending nearly forty miles from west to east, and varying in breadth from five to ten miles. Its highest point is upwards of 6,000 feet above the level of the sea. The southern face is precipitous, and has at its base a plain composed of tertiary rocks. The western flank is also steep, but the northern rises more gently from the Almeria river, which separates it from the Nevada chain. The principal mass of the Sierra is composed of limestone, which rests on clay slate, and is overlaid by calcareous conglomerates. The limestone is generally traversed by veins of calcareous and fluor spars, frequently so disposed as to resemble the stripes on the skin of a zebra. It is also sometimes magnetic, on account of disseminated magnetic iron. The prevailing strike of the beds is from east to west, but the strata are frequently much disturbed, and dip in opposite directions. Mr. Lambert considers the limestone to belong to the most inferior of the transition series, because its stratification is conformable to that of the old rocks constituting the nucleus of the Sierra Nevada, and because no organic remains have been yet discovered in it. At the eastern extremity, the limestone is overlaid by beds of gypsum containing masses and strings of native sulphur. There is no doubt the mines were worked by the Romans. The ore is generally found in nests or masses of considerable size, being largest where the strata are much disturbed; also in veins and branches of limited extent, which cross each other and generally form a communication between the nests. In these cases the ore is accompanied by fluor spar. At the mine of Arnafe, on the western side of the Sierra, a vein or mineral bed occurs between two strata of limestone, conforming to them in strike and dip; and other similar instances are mentioned in the paper. Mr. Lambert is of opinion that these metallic deposits were of contemporaneous origin with the limestone, and he conceives that they are to a certain extent superficial, as there is no instance of ore having been found at a greater depth than 200 yards from the surface. Fragments of galena occur in the lower part of the open fissures, enveloped in a red earth, which also contains rounded or angular fragments of limestone; they have been also found in the alluvial detritus of the valleys and dry ravines, often in considerable quantities, and, in one instance, to an extent of more than 100,000 tons. Galena is contained in the mountain chains to the east and west of the Sierra de Gador, but in less abundance.

6. 'On the constant presence of Polished and Striated Surfaces on the Rocks which form the Beds of Glaciers in the Alps,' by Prof. Agassiz, of Neuchatel.—The phenomena described in this paper occur not only at the lower extremity, where they are exposed by the melting of the glaciers, but wherever the subjacent rock may be examined by descending deep crevices in the ice; and they are ascribed to the abrading action of grains of quartz and other rocks moved by the glacier. That they were not produced by causes in operation anterior to the formation of the glacier, is evident from the scratches being constantly parallel to the direct movement of the ice, and sharp and fresh beneath existing glaciers, but less distinct in surfaces which have been for some time exposed to atmospheric influence. If an attempt were made to account for these scratches by the action of water, it would be necessary to imagine currents of enormous depth filling the highest Alpine valleys and descending in opposite directions from the narrow crests which lie between them. In the upper part of the valley of the Visch a rapid torrent runs beneath a glacier, corroding the bottom of the valley and polishing the