

changes of such an order and magnitude as those under consideration.

SECTION D.—ZOOLOGY AND BOTANY.

TUESDAY.

Prof. OWEN read a continuation of his Report on the Fossil Mammalia of Great Britain.—In the previous parts of the Report he had treated of the Carnivora and Marsupialia: in this he confined himself to an examination of the vegetable-feeders. Remains of the mammoth, of which he believed there was only one species, the *Elephas primigenius* of Cuvier, had been found in abundance in various parts of Great Britain, and not less than three thousand teeth had been found in various places. These teeth varied in appearance with age, and had thus led to the supposition that there were other species of mammoth. The remains of the mastodon found in Suffolk and Yorkshire, were undoubtedly identical with those of the miocene beds of France, thus making but one European species, the *Mastodon angustidens*. Bones of an extinct species of rhinoceros had been found in various parts of Great Britain. It possessed two horns, and was undoubtedly different from existing species. The teeth also of a species of hippopotamus had often been found, as in the cave at Kirksdale and other limestone rocks. In the Isle of Wight two distinct genera of pachyderms had been found; the Palæotherium and Anoplotherium. Of the former genus, there appears to have been six or seven species, and of the latter three. The teeth and fragments of bones of more uncommon forms still, had been found in the Isle of Wight and in Suffolk, which had been referred to animals of distinct genera, and called Chæropotamus and Hyracotherium. Remains of species of the genus *Sus*, had also been found by Dr. Buckland. Of the Ruminantia, the Irish elk as it had been called, has been also found in England. In structure this animal resembled the fallow deer, but was larger. The remains of a cervus, not differing from the red-deer, were frequently found with the mammoth and other animals. Remains also of the roebuck, and the goat and sheep, had been found associated with those of the mammoth. Remains of the aurochs, or European bison, had been found in various parts of England, and also of Ireland. According to Mr. Ball, these remains should be looked upon as those of an extinct species. In concluding his Report, Prof. Owen stated, that he never should have commenced these labours, nor could he have continued them, but for the suggestions and assistance of the British Association.

Mr. H. E. STRICKLAND then read a description of a 'Chart of the Natural Affinities of the Insectorial Order of Birds.'—At the Glasgow meeting, in 1840, Mr. Strickland had first proposed his plan for exhibiting the affinities of allied organic forms, by a process analogous, in some respects, to that of map-making. He now exhibited a large chart constructed on this plan, and showing the affinities of the genera in the order Insectores. The name of each genus is inscribed in an oval cartouche, and its affinities to other genera are indicated by connecting lines, the lengths of which lines are approximately proportionate to the remoteness of the affinities. Those genera which are most nearly allied are connected by a line of one degree, or unit, in length; and those less closely allied, by a line of two degrees. Genera so distant as to require to be placed in different sub-families, are united by lines of three or four degrees; those in different families by lines of five or six degrees; and those in different tribes by lines of seven or eight degrees. A line is drawn round those genera which constitute one sub-family, and the area thus inclosed is coloured, the surrounding space being left white. The sub-families which belong to the same family, are distinguished by the same colour; and the families are inclosed within a dotted line; while the boundaries of the tribes are marked by a red stripe. The names of the respective groups are inserted; and the whole assumes the appearance of a cluster of islands depicted on a map. The author expressed his belief that the true affinities of organized beings may be expressed with greater accuracy and conciseness by this method than by any other with which he was acquainted. Being a purely inductive process, the details of any branch of natural history may be in this way worked out and depicted without recourse to any theoretical assumptions. One result of it seems to be, that the true affinities of organic structures branch out irregularly in all di-

rections, and that no symmetrical arrangement or numerical uniformity is discoverable in the system of nature when studied independently of preconceived theory.

Prof. FORBES thought Mr. Strickland's map a good one, and might prove useful; but as a system of classification, it wanted principles to proceed upon.—Prof. OWEN approved of Mr. Strickland's smaller groups, and hoped he would prosecute his researches on this subject. Every part of every animal must be known before we could have a perfect system. Pallas had given an idea of the animal kingdom, by supposing it a network drawn up in the form of a cone, of which man formed the apex. He was disposed to adopt this view, supposing also that there were other lower points of the net, in which an organization was completed which did not appear in man. He rejected altogether quinary, circular, and other systems.—Dr. LANKESTER stated, that there were two objects in classification, the one that of arranging objects so that they might be easily examined and identified, and the second, that of placing nearest to each other objects which were most alike. The endeavour to embrace these two ends in one system had been the cause of all the differences among systematists. He thought Mr. Strickland's remarks too severe on artificial systems, as these must always be of great use when properly applied, and only to be condemned when assuming to occupy the position of a natural arrangement.—Mr. BALL condemned the quinary system and approved of Mr. Strickland's mode of arriving at his conclusions.

Dr. ALLMAN read a paper 'On the genus *Cirropteron*, Sars.'—In this communication it was maintained, that the genus *Cirropteron* had no real existence, having been founded by Sars on the imperfectly developed condition of a gasteropodous mollusc. Dr. Allman had himself bred from the ova of a gasteropodous mollusc animals referable to Sars' genus; and the singular ciliated disks with which the larvæ of buccinum, trochus, &c. are furnished, have been noticed by other observers. Dr. Allman called attention to the remarkable analogy which exists between these molluscan larvæ and the Rotifera, and advocated the necessity to the zoologist of an accurate knowledge, not only of the anatomy of the various organized beings which come under his observation, but of their history during the entire period of their existence.

WEDNESDAY.

Dr. ALLMAN read a paper 'On certain Peculiarities in the Arteries of the Six-banded Armadillo.'—The peculiarities noticed in this communication consist in a remarkable arrangement of vessels analogous to what has been already observed in the sloths, in the two-toed ant-eater, and in the lorises, and is characterized by the arteries having a tendency to divide rather than ramify, from which it results, that instead of a diffusely branched arterial distribution, the larger branches suddenly break themselves up into a number of small vessels, which anastomosing but sparingly, give rise to a series of vascular pencils, from which the ultimate supply of blood to the organs is derived. This remarkable arrangement is chiefly displayed in the arteries of the posterior extremities, in the caudal and in the epigastric arteries.

Prof. OWEN observed, that this structure in the armadillo was not like that in the Cetacea, which was used as a reservoir of blood for those animals when under water. This was a valuable addition to our knowledge of the comparative anatomy of mammalia.—Mr. BALL observed, that this arrangement had been supposed to be peculiar to slow-moving animals, but the armadillo was a very quick-moving creature.

Dr. ALLMAN then read a 'Synopsis of the Genera and Species of Zoophytes inhabiting the fresh waters of Ireland.'—The fresh-water Zoophytes of Great Britain have hitherto been all included under the following four genera, Hydra, Cristatella, Alcyonella, and Plumatella. Of these, Hydra is made to include four British species,—Cristatella one, Alcyonella one, and Plumatella has been described as containing three species. Of the above nine species, the author was of opinion that two must be erased, viz., the *Hydra verucosa* of Templeton, which appears identical with *H. fusca*, and the *Plumatella gelatinosa* of Flemming, which is evidently the same with Blumenbach's *Tubularia sultana*. To the seven species which remain, Dr. Allman was enabled to add five, of

which four do not appear to have been before noticed and the other is only found described in the Fauna of the Continent. The zoophytes at present included under Plumatella were distributed in the synopsis between two genera,—those with crescentic disks being retained under Plumatella, while those whose disks are circular were removed to Fredericella, a genus established by M. Gervais for this form of ascidian zoophyte. An important addition now made to the British zoophytes is Paludicella, discovered by W. Thompson, Esq. at Lough Erne, in the autumn of 1837, and since obtained abundantly by Dr. Allman in the Grand Canal near Dublin. In October, 1842, a hydroid zoophyte of much interest was discovered by Dr. Allman in the Grand Canal, Dublin; it is referable to no known genus, and occupies a position between Coryne and Hermia. For the reception of this zoophyte, therefore, he has been obliged to form a new genus, to which he has given the name Cordylophora. The synopsis, therefore, embraced several new species and two genera, now for the first time added to the British Fauna.

Prof. FORBES remarked on the value of this paper. In Fredericella we had the analogue of the marine genus Coryne, as we had in Hydra, that of Sertularia. This paper pointed out the impossibility of the existence of such a genus as Hassell's Echinochorium.

Dr. ALLMAN read a paper 'On a new Genus of Terrestrial Gasteropod.'—This highly interesting animal was found last autumn in the county of Derry by Mr. Andrews, of Dublin. Dr. Allman examined it, and convinced himself of its entire generic distinctness and importance. It constitutes a connecting link between Arion and Limax, differing from the former in the possession of a well-developed internal shell, and in the position of the genital pore, which is placed, as in Limax, behind the root of the right small tentacle; and from the latter, in the orifice to the respiratory sac being in the anterior margin of the shield, and in its truncated glanduliferous tail. To the new genus, which it was therefore necessary to constitute for the reception of the gasteropod, Dr. Allman gave the name Geomalacus; and to the present species, the only one of the genus as yet discovered, the specific name maculosus is appropriated.

Mr. BABINGTON presented three new additions to the Flora of Cork. They consisted, first, of *Erica Mackayii*, which had been previously found only in Connemara; second, the *Erica cilians*; and third, the *Dabæcia multifolia*.

Dr. LANKESTER exhibited specimens of the *Calothrix nivea*, and also of the red deposit formed by a species of animalcule belonging to the genus Astasia, and which he had previously described as inhabiting sulphureous waters. These specimens he had found on the shore near Cove, in a cavity of the limestone rock. The water in which they were found was highly impregnated with sulphuretted hydrogen. It did not appear to arise from any spring, and the gas was probably produced by the decomposition of the sulphates of the sea-water, in contact with the decomposing vegetable matter, in the cavity where it was found.

Mr. HUNT had observed living animalcules in waters impregnated with sulphuretted hydrogen. He had also succeeded in forming sulphuretted hydrogen by placing sulphates in contact with decomposing vegetable matter.

The Rev. W. HINCKS read a communication from Dr. Wood, 'On the economical Uses of certain Lichens.'—The object of this paper was to draw attention to the fact that the *Lecanora tartarea* and *parcelea* grew in abundance about Cork, and that the collecting of these lichens as dyes might become a source of employment for the poor. Specimens of the plants were then exhibited.

Mr. HINCKS exhibited the volumes of Sowerby's Fungi, which had been in the possession of the late Mr. Templeton, and which contained many valuable manuscript remarks.

Mr. PATTERSON stated that Mr. Templeton might be regarded as the father of natural history in Ireland. Dr. Drummond was his pupil, and to Dr. Drummond they were indebted for the Natural History Society of Belfast.

The SECRETARY read a paper from Mr. Waterhouse, of London, 'On the Classification of Mammalia.'—In this paper the author proposed a new arrangement, differing considerably from that of previous authors.