

know differs very much from modern biology in the nature of the specimens with which it has to deal; but even so, would a vertebrate palæontologist of any standing found a genus and species on the common leg-bone of a mammal because it was too decayed to recognize exactly to which mammal it belonged?

Dr. Knowlton, with the zeal for the technical application of their rules of nomenclature which characterizes a certain school of biologists in America, who take every opportunity these technicalities give them of renaming other people's species, has made himself responsible for *Benstedtia Benstedti*. A genus and species must be capable of diagnosis, and it now devolves on Dr. Knowlton to provide that diagnosis.

## NOTICES OF MEMOIRS.

### I.—GEOLOGICAL SURVEY OF SOUTHERN RHODESIA.

THE following particulars are extracted from the Report of the Director, Mr. H. B. Maufe, for September to December, 1910 (Salisbury, Rhodesia, 1911):—

Headquarters have been established in Bulawayo for the purpose of working in co-operation with the geological and mineralogical section of the Rhodesia Museum. The provision of a suitable topographical map is a question of prime importance. The farm plans compiled by the Surveyor-General on the scale of 400 Cape rods to the inch form the most suitable available basis for the geological field mapping. They are often far from satisfactory as regards topographical details, and the geologist's time will frequently be taken up in inserting the more important surface features.

November and December were spent in actual field mapping in the Enterprise Goldfield, situated to the east of Salisbury. An area of 50 square miles was finished, and a further area traversed, but not completely mapped.

The Enterprise Goldfield lies in a district of metamorphic rocks, extending almost thirty miles slightly north of east of Salisbury, and measuring from north to south eight miles or more. On the north, east, and south it is bounded by granite, which is later than the metamorphic rocks and causes contact alteration in them. The metamorphic rocks are divisible into three groups, as follows:—

- (1) A group consisting largely of epidiorite.
- (2) An ironstone group, which also includes some limestones.
- (3) A group of quartzites and conglomerates.

Each of these groups includes many varieties of rock, some of which occur in two or even three groups, but the groups as a whole are fairly well defined, and seem to correspond with the subdivisions described by Mr. F. P. Mennell in other parts of the country. The greater part of the metamorphic rocks are altered sedimentary rocks—altered conglomerates, sandstones, shales, and limestones. Up to the present the only igneous rocks met with which belong to the metamorphic series are the epidiorites forming the larger portion of group (1). Gold occurs in payable quantities in certain bands of schist intercalated in the epidiorites of group (1). Several mines working these bands are being energetically developed. The ironstone

group, the argillaceous beds of which are often highly charged with sulphides, are being prospected at the present time, and gold is reported to occur in many parts of this group. Group (3), though bearing certain signs of mineralization, seem to have received little attention hitherto. Gold also occurs in quartz veins and stringers traversing the metamorphic rocks, and these are naturally not neglected.

Iron-ore (chiefly hæmatite) is abundant. The huge excavation in Iron Mine Hill on the eastern part of Learig Farm is said to be the work of natives, who formerly smelted the ore for their own use. Limestone is being burnt for lime at Chishawasha. Large deposits, partly magnesian, partly a pure lime, as shown by analysis published in the *Agricultural Journal* for November, 1910, occur on the south side of Kilmuir Farm. A talc-schist of a pleasant dull-green colour is being used successfully for internal decoration in the Chishawasha Mission. The stone, in spite of its schistose structure, carves easily and takes a good polish.

The rocks later in age than the metamorphic series are all of igneous origin. They comprise the granites, together with some allied plutonic rocks more basic in composition, and a younger group of dykes and irregular masses of dolerite. In addition to the immense masses of granite which fringe the district under description, smaller masses are intruded into the metamorphic rocks and frequently crop out in the vleis. Small masses of a more basic plutonic rock are occasionally found in similar positions.

The later dolerite dykes, which are intruded into the granite and metamorphic rocks alike, call for no further description here.

The structure of the metamorphic rocks is exceedingly complex. The rocks have been intensely compressed by forces acting in a north and south direction, and thereby been thrown into folds ranging east and west, but occasionally diverging as much as 20 degrees on either side of these points. The compression has been so intense that the limbs of the folds have been pressed together, and now dip at the same angle and in the same direction.

II.—BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, EIGHTY-FIRST ANNUAL MEETING, HELD AT PORTSMOUTH, AUGUST 30—SEPTEMBER 6, 1911. LIST OF TITLES OF PAPERS READ IN SECTION C (GEOLOGY) AND IN OTHER SECTIONS BEARING UPON GEOLOGY.

Presidential Address by *A. Harker, F.R.S.*

*Clement Reid, F.R.S.*—The Geology of Portsmouth and District.

*Professor S. H. Reynolds.*—Further Work in the Silurian Rocks of the Eastern Mendips.

*Dr. A. R. Dwerryhouse.*—The Glaciation of the North-East of Ireland.

*Dr. W. F. Hume & J. I. Craig.*—The Geological Period and Climatic Changes in North-East Africa.

Report of the Committee for the Collection, Preservation, and Systematic Registration of Photographs of Geological Interest.

Report of the Committee to consider the preparation of a List of Characteristic Fossils.

Report of the Committee to Investigate the Erratic Blocks of the British Isles and to take measures for their preservation.

Report of the Committee for the investigation of the Igneous and Associated Rocks of Glensaul and Lough Nafooyey Areas, Co. Galway.

Joint meeting with Section E: Discussion on the Former Connexion of the Isle of Wight with the Mainland.

*Professor J. W. Gregory, F.R.S.*—Constructive Waterfalls.

Joint meeting with Sections K and E: Discussion on the Relation of the Present Plant Population of the British Isles to the Glacial Period, opened by *Clement Reid, F.R.S.*

*W. B. Wright.*—On the Lower Carboniferous Succession in the neighbourhood of Bundoran, S. Donegal.

*W. B. Wright.*—On the Occurrence of Submerged Forests in certain Lakes in Donegal and the Western Isles of Scotland.

*A. R. Horwood.*—On some new Rhætic Fossils from Glen Parva, Leicestershire.

*A. R. Horwood.*—On the Shell-layer in Mollusca. (See *GEOL. MAG.*, September, 1911, p. 406.)

*Dr. W. F. Hume.*—The First Meteorite Record in Egypt.

*R. W. Hooley.*—On the Discovery of Remains of *Iguanodon Mantelli* in the Wealden Beds of Brighstone Bay, Isle of Wight, and the adaptation of the pelvic girdle to an erect position and bipedal progression.

*Professor E. S. Moore.*—Siliceous Oolites and other concretionary structures in the vicinity of State College, Pennsylvania.

*Professor E. S. Moore.*—On the Pre-Cambrian Beds of Ontario.

*Rev. A. Irving.*—On the Occurrence of a Freshwater Limestone in the Lower Eocenes of the Northern Flank of the Thames Basin.

*Rev. A. Irving.*—A Remarkable Sarsen or Greywether.

*T. Ross Thomson.*—Wealden Ostracoda.

Report of the Committee appointed to enable Mr. E. Greenly to complete his researches on the Composition and Origin of the Crystalline Rocks of Anglesey.

Report of the Committee appointed to excavate Critical Sections in the Palæozoic Rocks of Wales and the West of England.

Report of the Committee appointed to investigate the Microscopical and Chemical Composition of Charnwood Rocks.

Report of the Committee appointed to enable Mr. C. Forster Cooper to examine the Mammalian Fauna in the Miocene Deposits of the Bugti Hills, Baluchistan. (See p. 473.)

Report of the Committee appointed to determine the precise significance of Topographical and Geological Terms used locally in South Africa.

Report of the Committee appointed to investigate the Fossil Flora and Fauna of the Midland Coal-fields.

List of titles of papers read in other Sections bearing upon Geology:—

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Report of Committee on Seismological Investigations.

*Professor H. H. Turner.*—Note on the Periodogram of Earthquake Frequency, from Seven to Twenty Years.

*Maxwell Hall.*—Sunspots, Earthquakes, and Rainfall.

*Professor O. Petterson.*—Great Boundary Waves: Parallaxic Tides set up in the Bottom Layers of the Sea by the Moon.

SECTION D.—ZOOLOGY.

Presidential Address by *Professor D'Arcy W. Thompson, C.B.*

*Professor G. Elliot Smith, F.R.S.*—The Origin of Mammals.

Discussion—speakers: *Professor A. Keith, Dr. C. W. Andrews, F.R.S., Dr. Marett Tims.*

*Professor Malcolm Laurie.*—The Hypostome and Antennæ of a reconstructed Trilobite (*Calymene*).

*Professor S. H. Reynolds.*—Pleistocene Mustelidæ.

*Dr. C. W. Andrews, F.R.S.*—The Extinct Reptiles of the Oxford Clay of Peterborough.

Report of the Committee on the Index Animalium.

*Dr. Elliott & Miss B. Lindsay.*—Remarks on Boring Molluscs.

SECTION E.—GEOGRAPHY.

*Professor J. W. Gregory.*—Constructive Waterfalls.

SECTION H.—ANTHROPOLOGY.

*A. L. Lewis.*—Dolmens and Cromlechs.

Report on Artificial Islands in Scottish Lochs.

*R. R. Marett.*—Pleistocene Man in Jersey.

*Dr. A. Keith.*—Cranium of the Cro-Magnon Type found by Mr. W. M. Newton in a Gravel Terrace near Dartford.

*Dr. A. Keith.*—Remains of a Second Skeleton from the 100 foot Terrace at Galley Hill.

*Dr. A. Keith.*—Fossil Bones of Man discovered by Colonel Willoughby Verner in a Limestone Cave near Ronda, in South Spain.

*R. R. Marett.*—Cave-hunting in Jersey.

*J. R. Mortimer.*—Notes on the Stature, etc., of our Ancestors in East Yorkshire.

*W. Dale.*—Memorials of Prehistoric Man in Hampshire.

*O. G. S. Crawford.*—The Distribution of Types of Implements in the Early Bronze Age in Britain.

Report on Lake Villages near Glastonbury.

*H. N. Davies.*—Notes of Human Remains of ancient date found at Weston-super-Mare.

*Rev. Dr. A. Irving.*—Later Finds of Horse and other Prehistoric Mammalian Remains at Bishop's Stortford.

Report on the Excavation of a Prehistoric Site at Bishop's Stortford.

SECTION K.—BOTANY.

*Professor F. W. Oliver, F.R.S.*—The Life-history of a Pebble Beach.

*Professor H. C. Cowles.*—A Fifteen-year Study of Advancing Sand-dunes.

*Dr. F. J. Lewis.*—The Forest Stages represented in the Peat underlying the Moorlands of Britain.

*Dr. M. J. Benson.*—The Structure of a new type of *Synangium* from the Calciferous Sandstone Beds of Pettycur, Fife, and its bearing on the origin of the seed.

*Dr. D. H. Scott, F.R.S.*—A Palæozoic Fern and its Relationships (*Zygopteris Grayi*, Williamson).

*Professor A. C. Seward, F.R.S.*—A Petrified Jurassic Plant from Scotland.

*H. Hamshaw Thomas.*—Recent Researches on the Jurassic Plants of Yorkshire.

*Miss T. Lockhart.*—A Contribution to our Knowledge of the Formation of Calcareous Nodules containing Plant-remains.

### III.—THE MAMMALIAN FAUNA IN THE MIOCENE DEPOSITS OF THE BUGTI HILLS, BALUCHISTAN.<sup>1</sup>

Interim Report of the Committee, consisting of Professor G. C. BOURNE (Chairman), Mr. C. FORSTER COOPER (Secretary), Drs. A. SMITH WOODWARD, A. E. SHIPLEY, C. W. ANDREWS, and H. F. GADOW, and Professor J. STANLEY GARDINER, appointed to enable Mr. C. Forster Cooper to make an examination thereof. (Drawn up by the Secretary.)

THIS expedition arrived in Jacobabad in the middle of January, 1911, and after obtaining the necessary camels, stores, and servants, proceeded into the Bugti territory and arrived in five days at Kumbhi. Here the fossiliferous beds were located and four weeks spent in working out the exposures each side of Kumbhi. The beds were then followed out to the eastward round the Zen Koh range, with varying success, the strata in parts being much disturbed and unsuitable for the preservation of fossils.

During the last four weeks of the expedition an important bone-bed was discovered at Churlando of a different character of deposition to the other beds. Owing to the difficult nature of the excavation, the lack of suitable labour, and to the fact that very heavy rains delayed the work for a week, much still remains to be done in this bed, and the interesting specimens obtained warrant its further exploration.

A considerable collection of mammalian remains was obtained from the various localities which is now in process of development and cleaning in the laboratories of the Natural History branch of the British Museum prior to a detailed examination and description.

The fauna consists largely of Anthracotheres, of which group many species are represented in the collection. Remains of extinct orders of Rhinoceros are also common, including an interesting new genus now in process of examination.

Fragments of small Artiodactyles also occur, but owing to the character of the deposits small forms are seldom preserved. The condition of the remains is unfortunately poor as a rule, partly owing to the weathering and partly to the damage done by contemporary crocodiles at the time of deposition, the remains of these animals being abundant as well as the marks of their teeth on the fossils obtained.

The expedition received much kindness and help from the Government officials, as well as from the ruling chiefs of Dera Bugti.

<sup>1</sup> Read before Section C (Geology), British Association, Portsmouth, September, 1911.