

a considerable break between the Waterberg and Pretoria Series. The glacial conglomerate, which lies at the base of the Karroo System, is on the same horizon as the well-known Dwyka conglomerate of Cape Colony. Glaciated surfaces have been met with further north than had previously been observed by Dr. Molengraaff, and the evidence of the striæ and of the boulders indicates that the general direction of the ice-movement was from north to south. Excellent pictures of glaciated surfaces are given. Investigations were made into the diamondiferous deposits of the Schuller, Kaalfontein, and Montrose mines. The diamonds are found in true pipes or volcanic vents, and in alluvial and other superficial deposits. The pipes appear all to belong to the same geological period, and they are evidently younger than the Pretoria Series, into which they have been intruded. There is, however, much resemblance in behaviour and constitution between the pipes now described and those of Kimberley, and if they prove to be contemporaneous the Transvaal pipes would be of post-Karoo age.

Mr. Kynaston and his fellow-workers are to be heartily congratulated on the results of their first year's work in the Transvaal, showing, as it does, abundant evidence of careful scientific research by well-trained observers, who are at the same time keenly alert with regard to questions of economic geology on which their labours are calculated to throw light.

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OBITUARY.

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ROBERT FISHER TOMES, J.P., F.G.S.

BORN 1823.

DIED JULY 10, 1904.

LAST July the geological world had to mourn the loss of a veteran geologist, Robert Fisher Tomes, of South Littleton, near Evesham. Although he may have appeared to have lived a somewhat secluded life, it was nevertheless an extremely active one. The administration of justice, educational matters, parish and county work, various branches of archæology, zoology, and geology, all received attention; whilst he was an excellent carver of old oak and an enthusiastic collector of old china—especially Worcester. His collections of fossil corals and birds are particularly fine, and he also possessed a number of type-specimens of bats, which unfortunately went to decay owing to inadequate preservation.

Mr. Tomes was born at Weston-on-Avon in 1823, and was the brother of Sir John Tomes, Bart., F.R.S., F.R.C.S., L.D.S., who died in 1895 (an odontologist of no mean rank, and a friend of Sir Richard Owen). He was Vice-Chairman of the Chipping Campden School Board for many years; Chairman of the Board of Guardians of Stratford-on-Avon for thirteen years (until 1879), when he went to live at South Littleton. He was appointed Alderman for the County Council of Worcester; subsequently being placed on

the Standing Joint Committee, on which he remained until his death in July of the present year. His knowledge of geology, especially of the country around Evesham, enabled him to indicate in the Cotteswold Hills places whence water was obtained for the supply of thirteen or fourteen villages. His views met with considerable opposition at first, but were, however, accepted without question by the engineer, and the work was accomplished at a moderate cost.

In 1860 Mr. Tomes was made a Corresponding Member of the Zoological Society of London, in recognition of the labour spent and the excellent results obtained from the examination of the Cheiroptera, and for his descriptions of many new species. His fine collection of birds from the county of Worcester testify to his taxidermic skill and knowledge of ornithology.

About the year, however, that he was elected a Corresponding Member of the Zoological Society, Mr. Tomes directed his attention to geological matters, opening the discussion as to the age of the Sutton Stone and Lias conglomerates of Glamorganshire. The subject was broached in 1863 on account of a *Gryphæa* having been sent by Mr. Tomes to John Jones, of Gloucester, for the purpose of figuring and describing in his paper "On *Gryphæa incurva* and its varieties" communicated to the Cotteswold Club; the stratigraphical position of the fossil having been given by Mr. Tomes as "White Lias of Bridgend, Glamorganshire." The fact that the *Gryphæa* was of great interest if it really occurred in what was known as the "White Lias," was naturally appreciated by Jones, but the fact was contested by Charles Moore, F.G.S., of Bath. Moore denied that Rhætic beds were exposed in the Bridgend cutting; but admitted that if the *Gryphæa* was associated with *Ostrea intusstriata* (*Plicatula intusstriata*), then the evidence for the Rhætic age of the deposit was strong, as it was then generally believed that *Plicatula* only occurred in the White Lias. Accordingly it was agreed that Tomes, Moore, Kershaw, and Gibbs should make a fresh examination of the section. Tomes discovered the little *Plicatula* adhering to a lump of Mountain Limestone firmly embedded in the Lias rock. Near the same horizon a large specimen of *Coroniceras Bucklandi* was discovered by Moore. After an examination of the coast-section in the neighbourhood of Sutton and a re-investigation of the Bridgend cutting (where a *Gryphæa* with "no less than six small specimens of *Ostrea intusstriata*" adhering was found), it was agreed that the species had a much more extended range in time than had been hitherto thought, and therefore could "no longer be looked upon as typical of White Lias." The matter then appeared settled, for Mr. Tomes submitted that there was but one explanation, and that was "that during the period of the deposition of the Rhætic beds *no such deposition* took place at the locality in question [Bridgend]," an opinion he re-stated in 1877, and added, "the Rhætic fauna of that period became in this manner mixed up with that of the true Lias, which was subsequently deposited." He held this opinion to the end, reiterating it in 1903

when dealing with the coral *Heterastræa rhætica*, from the *Avicula contorta* beds of Deerhurst, Gloucestershire.

Mr. Tomes became a Fellow of the Geological Society in 1877, and communicated numerous papers which appeared in the Quarterly Journal of the Society from 1878 to 1903. Whether short or long, these papers—all on fossil corals—embodied the results of critical examination and accurate field-work, although the results arrived at from an examination of the corals were frequently contested by Duncan. To the GEOLOGICAL MAGAZINE he contributed an even greater number of papers on the same subject, always making his own drawings.

L. RICHARDSON.

LIST OF TITLES OF PAPERS BY ROBERT FISHER TOMES, F.G.S.

- “On the Position of *Gryphæa incurva* in the Lower Lias at Bridgend”: Proc. Cotteswold Nat. F.C., vol. iii (1865), pp. 192–194.
- “On the Stratigraphical Position of the Corals of the Lias of the Midland and Western Counties of England and of South Wales”: Quart. Journ. Geol. Soc., vol. xxxiv (1878), pp. 179–195, and pl. ix.
- “A List of the Madreporaria of Crickley Hill, Gloucestershire, with Descriptions of some New Species”: GEOL. MAG., 1878, pp. 297–305.
- “On the Fossil Corals obtained from the Oolite of the Railway Cuttings near Hook Norton, Oxfordshire”: Proc. Geol. Assoc., vol. vi (1879), pp. 152–165.
- “Description of a New Species of Coral [*Thamnastræa (Synastræa) Walfordi*] from the Middle Lias of Oxfordshire”: Quart. Journ. Geol. Soc., vol. xxxviii (1882), pp. 95, 96, and fig. in text.
- “On the Madreporaria of the Inferior Oolite of the Neighbourhood of Cheltenham and Gloucester”: Quart. Journ. Geol. Soc., vol. xxxviii (1882), pp. 409–449, and pl. xviii.
- “On the Fossil Madreporaria of the Great Oolite of the Counties of Gloucester and Oxford”: Quart. Journ. Geol. Soc., vol. xxxix (1883), pp. 168–196, and pl. vii.
- “On some new or imperfectly known Madreporaria from the Coral Rag and Portland Oolite of the Counties of Wilts, Oxford, Cambridge, and York”: Quart. Journ. Geol. Soc., vol. xxxix (1883), pp. 555–565, and pl. xxii.
- “A Comparative and Critical Revision of the Madreporaria of the White Lias of the Midland and Western Counties of England, and of those of the Conglomerate at the base of the South Wales Lias”: Quart. Journ. Geol. Soc., vol. xl (1884), pp. 353–374, and pl. xix.
- “A Critical and Descriptive List of the Oolitic Madreporaria of the Boulonnais”: Quart. Journ. Geol. Soc., vol. xl (1884), pp. 698–723, and pl. xxxii.
- “On some new or imperfectly known Madreporaria from the Great Oolite of the Counties of Oxford, Gloucester, and Somerset”: Quart. Journ. Geol. Soc., vol. xli (1885), pp. 170–190, and pl. v.
- “Observations on some imperfectly known Madreporaria from the Cretaceous Formation of England”: Quart. Journ. Geol. Soc., vol. xli (1885), Abs. of Proc., pp. 111, 112.
- “On the occurrence of Two Species of Madreporaria in the Upper Lias of Gloucestershire”: GEOL. MAG., 1886, pp. 107–111.
- “On some new or imperfectly known Madreporaria from the Inferior Oolite of Oxfordshire, Gloucestershire, and Dorsetshire”: GEOL. MAG., 1886, pp. 385–398 and 443–452.
- “On Palæozoic Madreporaria”: GEOL. MAG., 1887, pp. 98–100.
- “On *Heterastræa*, a new genus of Madreporaria from the Lower Lias”: GEOL. MAG., 1888, pp. 207–218.
- “Notes on an Amended List of Madreporaria of Crickley Hill”: Proc. Cotteswold Nat. F.C., vol. ix (1890), pp. 300–307, and plate.
- “Observations on the Affinities of the Genus *Astrocania*”: Quart. Journ. Geol. Soc., vol. xlix (1893), pp. 569–573, and pl. xx.

- “Description of a New Genus [*Stelidioseris*] of Madreporaria from the Sutton Stone of South Wales”: *Quart. Journ. Geol. Soc.*, vol. xlix (1893), pp. 574–578, and pl. xx.
- “Observations on some British Cretaceous Madreporaria, with the Description of two New Species”: *GEOL. MAG.*, 1899, pp. 298–307.
- “Description of a Species of *Heterastræa* from the Lower Rhaetic of Gloucestershire”: *Quart. Journ. Geol. Soc.*, lix (1903), pp. 403–407, and figs. in text.

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JOHN BELL HATCHER.<sup>1</sup>

BORN OCTOBER 11, 1861.

DIED JULY 3, 1904.

THE Editor of the *Annals of the Carnegie Museum*, Pittsburgh, Pennsylvania, U.S., records with deep regret the death, on July 3rd, 1904, of his trusted associate, Mr. John Bell Hatcher.

Mr. Hatcher was born at Cooperstown, Brown County, Illinois, on October 11th, 1861. He was the son of John and Margaret C. Hatcher. The family is Virginian in extraction. In his boyhood his parents removed to Greene County, Iowa, where his father, who with his mother survive him, engaged in agricultural pursuits near the town of Cooper. He received his early education from his father, who in the winter months combined the work of teaching in the schools with labour upon his farm. He also attended the public schools of the neighbourhood. In 1880 he entered Grinnell College, Iowa, where he remained for a short time, and then went to Yale College, where he took the degree of Bachelor in Philosophy, in July, 1884. While a student at Yale his natural fondness for scientific pursuits asserted itself strongly, and he attracted the attention of the late Professor Othniel C. Marsh, the celebrated Naturalist, at that time palæontologist of the United States Geological Survey. Professor Marsh, as soon as the young man had received his diploma, commissioned him to undertake a palæontological investigation in south-western Nebraska. From the summer of 1884 until the year 1893 he was continuously in the employment of Professor Marsh. During these years he conducted explorations over a wide area in the States of Nebraska, the Dakotas, Montana, Utah, Wyoming, and Colorado. These expeditions to the western country, which usually began early in the spring, continued until late in the fall, or even into the early winter. He also collected in the winter months and early spring in Maryland and North Carolina. His success as a collector was phenomenal, and the scientific treasures which he unearthed greatly enriched the collections of the United States Geological Survey and of the Peabody Museum in New Haven. It was upon the collections of vertebrate fossils made by J. B. Hatcher that Professor Othniel C. Marsh based to a very large extent many of his most important papers, and to Hatcher more than to any other man is due the discovery and collection of the *Ceratopsia*, perhaps the most striking of all the extinct reptilia. Very little had been known about them, and before

<sup>1</sup> Reprinted, slightly abridged, from Dr. W. J. Holland's notice in *Annals of the Carnegie Museum*, vol. ii, No. 4 (1900), pp. 597–604.