

OBITUARY.

THOMAS MELLARD READE, F.G.S.,

Assoc. M. Inst. C. E., F.R.I.B.A.

BORN MAY 27, 1832.

DIED MAY 26, 1909.

MR. MELLARD READE was the younger son of William James Reade and Mary Mellard (of Newcastle-under-Lyme). His father, who was a man of high character and studious habits, but not successful from a worldly point of view, had in 1830 opened a school in Mill Street, Liverpool, and there Thomas Mellard Reade was born in 1832. Descended on the father's side from a family of Staffordshire yeomen, of whom the head member settled in Cheshire in 1730, there were among his kinsmen Sir Thomas Reade, Deputy Adjutant-General at St. Helena during Napoleon's captivity, and the Rev. Joseph Bancroft Reade, a pioneer in photography who was elected a Fellow of the Royal Society in 1838. On his mother's side he was a cousin of Mrs. Craik, authoress of *John Halifax, Gentleman*.

After receiving his elementary education in private schools at Liverpool and at Seacombe in Cheshire, Mellard Reade about the end of 1844, before he was 13 years of age, became a pupil in the office of Messrs. Eyes and Son, architects and surveyors, at Liverpool. In their office, and subsequently as a draughtsman in that of another local architect, Mr. H. Horner, he laboured diligently for a period of eight years. Early in 1853 he entered the service of the London and North-Western Railway at Warrington, becoming in due course principal draughtsman in the northern division of the Company's civil engineering department.

The knowledge and experience he had thus acquired during fifteen years enabled him in 1860 to commence private practice in Liverpool as an architect and civil engineer, and in this he was eminently successful. Among many works he laid out the residential estate of Blundellsands in 1865, fixing his own home there in 1868, after having married in 1866 the widow of Mr. Alfred Taylor, C.E. Appointed architect to the Liverpool School Board in 1870, he retained the office until 1902, having designed and superintended the erection and enlargement of many schools. He also carried out much other architectural and engineering work. In 1871 he was elected an Associate Member of the Institution of Civil Engineers and in 1878 a Fellow of the Royal Institute of British Architects.¹

Although from boyhood he had been interested in science, and especially in geology, it was not until he was about 35 years of age that he began to give special attention to the subject. In 1870 he commenced the long series of geological articles which he communicated to scientific societies and journals, and in 1872 he was elected a Fellow of the Geological Society. His first important paper was on "The Geology and Physics of the Post-Glacial Period, as shown in the deposits and organic remains in Lancashire and Cheshire". This

¹ For most of the above particulars and for the supplementary list of his father's geological papers we are indebted to Mr. Aleya Lyell Reade, author of *The Reades of Blackwood Hill*.

article was brought before the Liverpool Geological Society in 1871 and published in 1872, while the main facts and conclusions were printed in advance in the *GEOLOGICAL MAGAZINE* for March, 1872. The full memoir, illustrated by colour-printed maps and sections, was a model of carefully recorded observations; and the author was enabled to make out the succession of changes which affected the region subsequent to the formation of the Boulder-clay. In particular he called attention to the marine Formby and Leasowe Beds which occur between the Inferior and Superior Peat and Forest Beds.

In 1873 he gave an account of the Buried Valley of the Mersey, and predicted that the tunnel which it was proposed to make beneath the river would intersect a gully filled with Boulder-clay. This was verified on the completion of the tunnel in 1885.

The Drift beds of the North-West of England and North Wales formed the subject of two papers brought before the Geological Society in 1873 and 1882, in which he maintained the glacio-marine origin of the Boulder-clay of the lower-levels, regarding as true Till, formed under or in front of the local glaciers, the Boulder-clay of the mountain regions.

He was elected President of the Liverpool Geological Society during the Sessions 1875–7, and again on two subsequent occasions, 1884–6 and 1895–7. In the address published in 1877 he took as his subject “Geological Time”, giving tabulated calculations of the total solids in solution removed annually from each rainfall area and group of strata in England and Wales. This essay with additional matter was reprinted in 1879, in a little volume entitled *Chemical Denudation in relation to Geological Time*. It included also a paper on “Limestone as an Index of Geological Time”, read before the Royal Society in 1879. Calculating the amount of carbonate and sulphate of lime carried away annually from the igneous rocks on the earth’s surface, and the thickness of deposit that would result therefrom, Mellard Reade compared this with the assumed thickness of limestone in the sedimentary crust of the earth, and estimated that a period of about six hundred million years would be necessary for the entire series of stratified formations. Although subsequent researches tend greatly to lessen the estimates of geological time, he may justly be said to have initiated this instructive line of inquiry.

While he continued his researches on local geology he brought his experience on the Drifts to bear on other regions in the north and east of England, in Ireland and Scotland; and he gave much attention to Tidal Action as a Geological Cause, to Pebble Ridges, the Circulation of Water in Sandstone, the Physiography of the Trias, and other subjects.

In 1886 he published his important and elaborately illustrated volume, *The Origin of Mountain Ranges considered experimentally, structurally, dynamically, and in relation to their Geological History*. In it he brought forward the results of much original study and experiment, dealing especially with the effects of underground temperature on the expansion of rocks beneath thick accumulations which prevented the escape of heat, and led to folding, buckling, and uplift of the formations. He also for the first time pointed out

that at a certain depth in a cooling solid globe there must be a 'level-of-no-strain', a conception which has been generally recognized as of great significance in indicating that the disturbances are likely to be confined to a comparatively thin crust.

In recognition of this work and of his other contributions to geological science the Murchison Medal was awarded to him by the Council of the Geological Society in 1896, when Dr. Henry Woodward was President.

In 1903 Mellard Reade published *The Evolution of Earth Structure, with a theory of geomorphic changes*. In this work he explained the geographic relief of the globe as due (1) to differential alterations of volume in large sections, which take place with extreme slowness and, being deep-seated, upheave or depress portions of the earth's crust without wrinkling it; and (2) to the tangential creep and ridging up arising from the heating of sediments and variations of temperature, and consequent expansion, within the earth's crust brought about by sedimentary deposition. He further illustrated the subject with the results of many experiments on the folding and fracture of materials, and reproduced the account of investigations made in conjunction with Mr. Philip Holland on slaty cleavage. He also republished some essays on denudation, the permanence of oceans and continents, and other subjects bearing on the question of the structure of the earth and the origin of its main features.

During the last ten years Mr. Reade worked a good deal with Mr. Philip Holland, F.I.C., and together they published papers dealing with mechanical and chemical analyses of Ludlow rocks and Old Red Sandstone and Marl, and also with the subject of sands and sediments, treating these latter materials stratigraphically, microscopically, and chemically. From their observations the authors were impressed with the great amount of micro-sediment met with, such as the very fine powder of quartz which they termed quartz-dust. They observed that clay and iron-oxides are present in the clearest sea-water, and particles of carbonate of lime likewise occur, held up by the clay and not in solution. Finally they pointed out that the sea would carry about and distribute these micro-sediments, and thus make important additions to oceanic deposits.

The final paper by Mr. Mellard Reade, a short article on "The Mechanics of Overthrusts", was printed in the *GEOLOGICAL MAGAZINE* for February of the present year.

Thus to the last he remained an indefatigable worker on dynamic geology and on the architecture of the earth's crust, subjects to which his professional experience advantageously and perhaps naturally led him. The business of his life indeed afforded him many opportunities, which he fully utilized, of seeing fresh sections of the strata, and it inculcated those methods of precision which characterized his records and experiments.

A severe illness during infancy produced a certain amount of deafness from which Mellard Reade suffered until the end of his days, and it increased with advancing years. On this account he rarely attended scientific meetings other than those of the Liverpool Geological Society. He printed two lists of his geological papers—

1. LIST OF SCIENTIFIC PAPERS AND WORKS, 1870-90. Nos. 1-112. 8vo; London, 1890.
2. SECOND LIST OF SCIENTIFIC PAPERS AND WORKS, 1891-1904. Nos. 113-82. 8vo; London, 1905.

The papers enumerated in the above lists amount to 182. The following list includes the papers since published, and it may be remarked that from 1870 to the present year one or more articles, and on an average five, appeared each year:—

- SUPPLEMENTARY LIST OF SCIENTIFIC WRITINGS, 1905-9. Nos. 183-96.
1905. (183.) "Notes on some specimens of Lancashire Boulder Clay": Proc. Liverpool Geol. Soc., 1904-5, vol. x, pt. i, pp. 38-42.
 - (184.) "Sands and Sediments." Part II: "Geologic Sediments of Marine, Estuarine, or Fresh Water Origin," by T. M. R. and Philip Holland: op. cit., 1904-5, vol. x, pt. i, pp. 48-78.
 - (185.) "Pleistocene Clays and Sands of the Isle of Man," by T. M. R. and Joseph Wright: op. cit., 1905-6, vol. x, pt. ii, pp. 103-17.
 1906. (186.) "Radium and the Radial Shrinkage of the Earth": GEOL. MAG., pp. 79, 80.
 - (187.) "Sands and Sediments." Part III (final), by T. M. R. and Philip Holland: Proc. Liverpool Geol. Soc., Session 1905-6, vol. x, pt. ii, pp. 132-56.
 - (188.) "Radium and Geology." Letter to *Nature*, vol. lxxiv, p. 635.
 - (189.) Statement on "Physiography of Coast between Rhyl and Gosforth, and Inferences as to Recurrence of Land Movements in the Future"; also further replies to definite questions: Report of Royal Commission on Coast Erosion, Appendix No. xxii, pp. 209-11.
 - (190.) "Analyses of Ludlow Rocks," by T. M. R. and Philip Holland; Proc. Liverpool Geol. Soc., 1906-7, vol. x, pt. iii, pp. 198-213.
 1907. (191.) "Post-Glacial Beds at Great Crosby as disclosed by the New Outfall Sewer": op. cit., 1907-8, vol. x, pt. iv, pp. 249-61.
 1908. (192.) "Oceanic Deeps": GEOL. MAG., 1908, p. 19.
 - (193.) "Analyses of Longmyndian Rocks," by T. M. R. and Philip Holland: Proc. Liverpool Geol. Soc., 1907-8, vol. x, pt. iv, pp. 276-87.
 - (194.) "A Prehistoric Forest at Waterloo (near Liverpool)," reprinted from the *Waterloo Herald* (newspaper) of October 31, 1908.
 - (195.) "The Mechanics of Overthrusts": GEOL. MAG., November, p. 518.
 1909. (196.) "The Mechanics of Overthrusts": GEOL. MAG., February, pp. 75-6.

MISCELLANEOUS.

THE BURNING CLIFF NEAR LYME REGIS.¹—MR. A. C. G. Cameron, writing from Harcombe Bank, Uplyme, February 9, 1909 (in reference to the letter of "Passer Vennensis" in our February Number), expresses his conviction that paraffin was thrown at times on the 'volcano'. He never witnessed such volumes of smoke arising from the mound of burning shale as are depicted on some of the picture postcards, and he concludes that if they did not touch up their photographs some of the photographers must have brought paraffin with them to enliven the smouldering masses. Mr. Cameron adds that he has taken from the mound beautiful specimens of burnt red shale with Ammonites, "not cooked with paraffin."

ERRATA IN JUNE NUMBER.

- p. 242, l. 9 from bottom: *for* Professor of that subject, the eminent John Goodsir, *read* Professor of Anatomy, the eminent John Goodsir.
- p. 244, l. 11 from bottom: *for* And the Ostracodermi, *read* And the Heterostraca.

¹ Accidentally omitted from the May Number, p. 228.