

value of such work to us. It is just such work that we need, to put our ideas into more distinct and scientific forms; and modern chemistry will evidently do this service more rapidly than we could have hoped. Mr. Perman's salts were no doubt more tractable than those that are the components of rocks, but then it is quite certain that his agencies have been applied to rocks fully in proportion to the refractoriness of their materials. And Adams's experiments upon the flow of marble show that some rocks, at any rate, are not beyond the power of laboratory treatment.

In this Magazine for May, 1903, I attempted to apply the work of Roberts-Austen on the Diffusion of Metals to the Diffusion of Granite into Crystalline Schists, and, at the close of my paper, I dwelt on difficulties arising from the heterogeneity of the materials of rocks. But it is clear that chemical reaction between solids adds vastly to the possibilities of solid diffusion unaided by such changes, and a hope of further information of the kind is expressed in the concluding paragraph of the paper quoted.

Geologists will look forward with interest to the full text of Mr. Perman's paper, and hope that he will pursue these researches further still.

EDWARD GREENLY.

OBITUARY.

JOHN FRANCIS WALKER, M.A., F.L.S., F.I.C., F.C.S., F.G.S.
FORMERLY FELLOW OF SIDNEY SUSSEX COLLEGE, CAMBRIDGE.

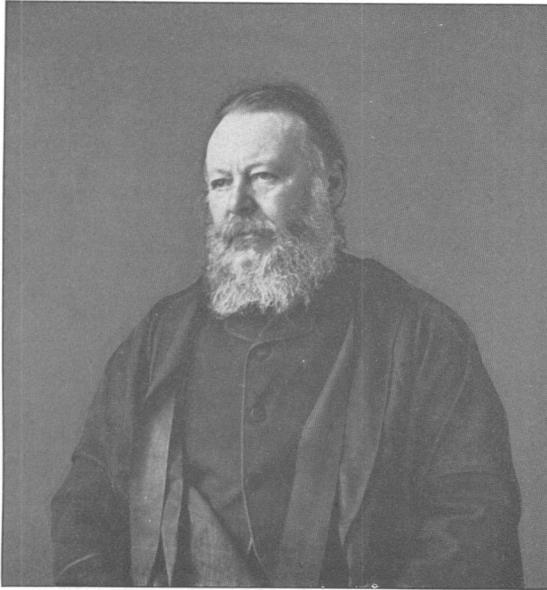
(WITH A PORTRAIT, PLATE XVI.)

BORN Nov. 25, 1839.

DIED MAY 23, 1907.

ALL lovers of Yorkshire may well feel proud of the many eminent geologists who either claim it as their birthplace, or have adopted this grand county, so rich in geological and palæontological interests, as their home. One recalls to mind the names of some belonging to the past and some still present with us: Young and Bird, Dr. Wm. Smith, the Williamsons, Martin Simpson, W. Vernon Harcourt, John Phillips, Dr. H. C. Sorby, Dr. Murray, J. Leckenby, Sir Charles Strickland, Dr. John Lycett, Rev. Professor J. F. Blake, W. H. Hudleston, Dr. Reed of York, Professor L. C. Miall, Ralph Tate, Jas. Wm. Davis of Halifax, Dr. Tempest Anderson, Samuel Chadwick, G. W. Lamplugh, and many others. To those worthies whose names are inscribed upon her past records, must also now be added that of John Francis Walker.

Born at York, Nov. 25th, 1839, J. F. Walker was, by inheritance, a Freeman of that city, where his family had resided for several generations, his grandfather having held the office of Sheriff in 1841. At an early age he commenced his education at St. Peter's School, York, and at 18 he became a student at the Royal Agricultural College, Cirencester, where under Dr. Voelcker, F.R.S., Professor of Chemistry, and Professor James Buckman, F.G.S., Professor of Natural History, he imbibed that earnest love of chemistry and geology which had such an important influence on his future career in life. In 1862 he entered Sidney Sussex College, Cambridge, and was bracketed first in the Natural Science Tripos in 1866. From Cambridge, after taking



J. F. Walker

his degree, Mr. Walker proceeded to the University of Bonn, where he studied organic chemistry under Professor Keckule, and remained in Germany during the Franco-Prussian War. Returning to London, John Francis Walker studied Law, and was in due course called to the Bar, but never practised.

He subsequently returned to Cambridge as Chemical Lecturer, and was elected to a Fellowship in Sidney Sussex College, where he had formerly been a student. But even his love for chemistry was in time entirely overshadowed by his stronger attachment to geology.

In 1867 he was elected a Fellow of the Geological Society, and in 1873 of the Linnean Society. About this time he also became a Fellow of the Chemical Society, and a member of the Geologists' Association.

J. F. Walker took the deepest interest in collecting the fossils from the Lower Greensand of Cambridgeshire, known generally as the "Copolite Workings," and on May 7th, 1867, he communicated his first paper to the Yorkshire Philosophical Society on "Some new Coprolite Workings in the Fens" (*GEOL. MAG.*, Vol. IV, p. 309), and later on in the same year another paper, "On some New Terebratulidæ from Upware" (*GEOL. MAG.*, Vol. IV, p. 454, Pl. XIX).

In 1882 Mr. Walker married Miss Alice Cracknell, of Knowle House, Ealing, W., and afterwards retiring from Cambridge he settled at 45, Bootham, York, devoting the greater part of his time to his geological pursuits.

During his residence in York, for the last 25 years, John Francis Walker has taken the deepest interest in the prosperity of the Yorkshire Philosophical Society's Museum, and has been for some time past its senior Vice-President and Honorary Curator of its Geological Collection, to which he has also been a most liberal donor.

He presented the types of his Cambridge Greensand Brachiopoda to the British Museum, and those illustrating his joint paper with Mr. G. W. Lamplugh, "On the Brachiopoda from the Lower Greensand of Leighton Buzzard, Bedfordshire," to the Geological Society's Museum.

Mr. S. S. Buckman, F.G.S., writes to the Editor:—"The loss of our friend and fellow-worker in geology, John Francis Walker, will be keenly regretted by all who are interested in the study of Brachiopoda. They will miss a genial friend who was ever ready with kind sympathy and practical help. He had accumulated a splendid collection of British and foreign Brachiopoda; and he would place his knowledge and his specimens at the disposal of other students with the greatest generosity. Many anecdotes are told of his readiness to help. If an investigator wished to examine certain specimens from a Yorkshire locality and Mr. Walker had not a sufficiently good series, he would take the trouble to make a special visit to the locality in order to obtain the necessary material. Or a student wishing to compare some foreign species with its British allies, made application to Mr. Walker. If he possessed specimens they were placed at the student's disposal; but on occasions when he had not any examples he has sent to the Continent to purchase them, and has desired the student to keep one of the best for his own

collection. Spontaneously, too, he enriched many a cabinet. A box of specimens would arrive with a kindly note to say that he had obtained an interesting series from some locality, and he hoped his correspondent would find the enclosed specimens an addition to his series.

“Although Mr. Walker collected Brachiopoda of all ages and all countries, he perhaps paid most attention to British Jurassic species. He was the first to find the rare *Dictyothyris* [*Terebratula*] *Morieri* in England, and one of his earliest papers gave an account of the discovery. For many years he spent some portion of the Summer on the Dorset coast to work the rich deposits in the neighbourhood of Bridport; and he published some papers on his discoveries in this district. He also made sojourns in the Cotteswolds; while at other times his hammer was busy among the rocks of Yorkshire. Only last Summer he made a collecting tour among the Jurassic rocks of the Normandy coast, and several of his friends' cabinets are the richer for specimens which he then obtained. All who have had the good fortune to join Mr. Walker in his geological excursions will feel the keenest regret that they will no more hear his cheery voice, or be able to share his great enthusiasm over the discovery of some fine specimen.”

One of his most attached Yorkshire friends, Mr. G. W. Lamplugh, F.R.S., writes:—“Placidly and unobtrusively, he stood aside to let the turmoil pass him, and only those who were privileged long to enjoy his friendship—to be among whom I count myself fortunate—could appreciate the depth of his knowledge and of his kindness.

“In his palæontological studies his aim was toward an ideal thoroughness that perhaps is unattainable, and he was always content—even, as it seemed to me, too content—to wait for conditions that should approach his ideal. Thus, much work of excellent purport that he contemplated, and might have done well, because it could not be done perfectly remained undone to the end. Although his collection of the Mesozoic Brachiopoda—his favourite and lifelong study—was probably the most extensive that has ever been made, his saying was always—‘We want more material! We must wait till we have sufficient material!’ And it was his philosophical grasp of the broader problems of his subject that led him to this attitude, and not merely the spirit of the collector. The fundamental principle of his method found expression in his favourite dictum: ‘It would be good for palæontology if all type-specimens should be destroyed!’—and most workers who have striven to follow the recent developments of palæontological science will apprehend the truth that underlies this paradox. Walker, firmly holding the evolutionary idea to which his work had led him, recognized that ‘the true type of a species is its centre, where the individuals are most thickly clustered and most closely resemble each other,’ and that ‘a named figured specimen is only a fixed point’ which may, or may not, happen to be near or within the central cluster of the species. Hence, he said, no single individual can adequately represent a species, and the so-called species based on type-specimens are of unequal value and often misleading.

“These ideas were expressed baldly and without specific demonstration in his brief paper ‘On the Formation of a Species,’ published in the *GEOLOGICAL MAGAZINE* for January, 1905 (Dec. V, Vol. II, pp. 15–17); but no one unacquainted with the worker can have guessed from it how huge was the store of exact observation that underlay this apparently sporadic expression of opinion.

“Walker’s quiet enthusiasm in a task that appealed to him was well exemplified by the manner in which he followed up the discovery of a fossiliferous band rich in *Brachiopoda* at the top of the Lower Greensand near Leighton Buzzard, which enlisted his attention five years ago. During two successive summers he spent many days on the spot, accumulating material and educating the workpeople in the collection of specimens. Not only the quarrymen but also the children of the quarrymen became his willing helpers, and will long remember his kind and generous presence among them. His aim was to acquire the whole of the *Brachiopoda* that could be obtained from the limited nodular band that yielded the fossils, with the idea that it would give him the opportunity at last for amassing sufficient material to deal adequately with the question of ‘species’ and their relation to ‘varieties.’ Some preliminary results of his work were published, not very willingly on his part, in our joint paper in the *Quarterly Journal of the Geological Society* for May, 1903 (vol. lix, pp. 234–265, pls. xvi–xviii), based on a collection that would have been already too large for the patience of most palaeontologists, though the refrain to his specific descriptions in this paper is still ‘the want of further material.’ His subsequent accumulation of the specimens went steadily on, until he could number them by hundreds or thousands, all laboriously cleaned, measured, and sorted, into their proper specific relationship, ready for the final work to be done. And, a short time ago, when I wrote to tell him that a recent visit to the section led me to think that the calcareous lenticles had been practically all removed in quarrying, so that he must not hope for a fuller series of the fossils, he replied cheerily that this could not be quite so, as he had just received a fresh parcel from the quarrymen that added to our knowledge.

“But now, by the sad event of his short illness and untimely death, we are reminded once more that no single life is long enough for the completion of such work, and that fragmentary instalments alone are possible to us. For the task unfinished there is indeed in his case this slight consolation, that the concrete material which he so patiently collected and brought into order lies ready for the future student to take up the arrested work. So that not only by what he himself achieved, but also by the achievement that he has made possible for the workers who will follow him, the name of John Francis Walker will be remembered and honoured.

“The loss to palaeontological science is severe. But still more severe is the loss, to us who knew him, of an ever-genial, broad-minded, big-hearted friend.”

Mr. Linsdall Richardson writes to the Editor:—“To geologists like myself Mr. Walker was chiefly known as a keen *Brachiopodist*. The writings of the late Dr. Thomas Davidson, F.R.S., in the *Palaeontographical Society’s* volumes, show that he was in frequent

communication with that eminent palæontologist. Of his extensive collections, that of Brachiopoda was perhaps one of the best in the world. His kindness was proverbial, and he was ever ready, by the gift of specimens and the loan of literature, to assist anyone who was working at his favourite subject, and often took much trouble and expense to meet the requirements of his many friends and correspondents. At the time of his death Mr. Walker had been a Fellow of the Geological Society for forty years. His latest piece of Brachiopod work, upon which, indeed, he was elaborating at the time of his death, related to the Fullers' Earth Brachiopoda, more especially to those from the Bath-Doultling district, and was to have been a joint communication with the writer to the Geological Society."¹

He leaves a widow and one son, Mr. Gelson Walker, to deplore his loss.

The following is a list of Mr. J. F. Walker's published papers:—

1866. "On the Fossils contained in a Lower Greensand deposit of Phosphatic Nodules in Bedfordshire": *Ann. Mag. Nat. Hist.*, vol. xviii, pp. 31-32, 381-386.
1867. "A Reply to Mr. H. G. Seeley's Remarks on my account of the Phosphatic Deposit at Potton, in Bedfordshire": *ibid.*, vol. xx, pp. 118-122.
 "On some new Coprolite Workings in the Fens": *GEOL. MAG.*, Vol. IV, pp. 309-310.
 "On some new Terebratulidæ from Upware": *GEOL. MAG.*, Vol. IV, pp. 454-456.
1868. "On a new Phosphatic Deposit near Upware, Cambridgeshire": *GEOL. MAG.*, Vol. V, pp. 26-27.
 "On the Species of Brachiopoda which occur in the Lower Greensand at Upware": *GEOL. MAG.*, Vol. V, pp. 399-407.
 "Occurrence of *Terebratula (Waldheimia) pseudo-jurensis* (Leymerie) in England": *Ann. Mag. Nat. Hist.*, n.s., vol. i, p. 386.
 "On the Occurrence of the genus *Auser* in the peat and gravel deposits in Cambridgeshire": *ibid.*, vol. ii, p. 388.
1870. [Letter on] "Fossil Insects in the Bournemouth Leaf-Bed": *GEOL. MAG.*, Vol. VII, p. 299.
 "*Rhynchonella* from Bradford Clay": *Proc. Yorks Nat. Club*, 1869; *GEOL. MAG.*, Vol. VII, p. 299.
 "On Secondary Species of Brachiopoda": *GEOL. MAG.*, Vol. VII, pp. 560-564.
1876. "New British Brachiopoda": *GEOL. MAG.*, Dec. II, Vol. III, p. 574.
 (With W. H. Hudleston.) "On the Distribution of the Brachiopoda in the Oolitic Strata of Yorkshire": *Rep. Yorks Phil. Soc.*, pp. 7-12.
1878. "On the Occurrence of *Terebratula Morieri* in England": *GEOL. MAG.*, Dec. II, Vol. V, pp. 552-556.
1888. "On the Spinose *Rhynchonella* (genus *Acanthothyris*, d'Orbigny) found in England" (in conjunction with S. S. Buckman): *Yorks Phil. Soc. Rep.*
 "On *Terebratula bisinuata*, Lam., from the London Clay of Hampshire": *Yorks Phil. Soc. Rep.*
 "On Oolitic Brachiopoda new to Yorkshire": *Yorks Phil. Soc. Rep.*
1892. "The Discovery of *Terebratulina substriata*, Schlotheim, in Yorkshire": *GEOL. MAG.*, Dec. III, Vol. IX, p. 364.
 "On Liassic Sections near Bridport, Dorsetshire": *GEOL. MAG.*, Dec. III, Vol. IX, pp. 437-443.
 "On Yorkshire Thecidea": *GEOL. MAG.*, Dec. III, Vol. IX, p. 548.
1903. "On a Fossiliferous Band at the top of the Lower Greensand near Leighton Buzzard, Bedfordshire": *Quart. Journ. Geol. Soc.*, vol. lix, pp. 234-265.
1905. "On the Formation of a Species": *GEOL. MAG.*, Dec. V, Vol. II, pp. 15-17.

¹ See Abstract of Proceedings, Geol. Soc. of London, June 19, 1907, *ante*, pp. 374-5.