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ORIGINAL ARTICLES.

I.—EMINENT LIVING GEOLOGISTS.

GEORGE WILLIAM LAMPLUGH, F.R.S., President Geol. Soc., Assistant Director of the Geological Survey of England and Wales.

(WITH A PORTRAIT, PLATE XII.)

IT has frequently been asserted that the "born geologist"—as distinguished from the geologist made by education and training—owes his conception chiefly to *the formation* on which he happens to be born. Nor is it the beauty of the scenery and the attractiveness of firth and fell, mountain and glen, that usually give the impulse in the making of the geologist. It comes in most cases from *the fossils* he sees strewn around him in quarry or hillside—things that can be collected and fascinate the youthful mind even more than the rocks themselves. But whether the strata or the fossils are the stimulus required, it is beyond dispute that Yorkshire—in which both are conspicuous—takes a leading place in England as the birthplace of so many eminent geologists in the past century, and amongst them the subject of our present sketch worthily deserves to find a place.

George William Lamplugh was born at Driffield, East Yorkshire, on April 8, 1859, and here he spent his early years until he removed with his widowed mother to the coast at Bridlington when he was at the impressionable age of 13. It is scarcely possible that anyone having any sympathy with Nature should spend his youthful days upon the Yorkshire coast without becoming more or less of a geologist. Young Lamplugh soon began to collect the fossils from the Chalk and Drift, the latter deposit being a veritable open-air museum from the variety of its transported rocks and fossils. From the desire to know more about his collections he was led to the serious study of geology and to seek association with Yorkshire geologists, always a numerous and kindly folk. Amongst these he met with members of the Geological Survey working at the time in the district. Thus began a lasting friendship with the late J. R. Dakyns, with whom he spent some holidays in the field in various parts of the country. Circumstances compelled Lamplugh to enter early into business, but he resolutely determined to make science the serious object of his life, even if it did not procure for him the necessary means of livelihood.

Among the geological deposits on the Yorkshire coast that soon attracted Lamplugh's attention was the Boulder-clay series, to the

divisions of which, and in particular that known as the Bridlington Crag,¹ he devoted very careful work, and published the results in a series of papers, commencing in the *GEOLOGICAL MAGAZINE* for November, 1878 (pp. 509–17), in which the position of the shell-bearing beds in relation to the Boulder-clay, sands, and gravels is shown.

Besides the additions to the marine fauna made by Mr. Lamplugh (and identified by Dr. H. Woodward, F.R.S.), he records the discovery (in 1879, *op. cit.*, p. 393) of a freshwater deposit rich in shells of *Limnæa peregra*, suggesting envelopment and transportation by the land-ice of both *freshwater* and marine deposits with the shells peculiar to each. He also read a paper in 1879 to the Yorkshire Geological and Polytechnic Society "On the Glacial Beds in Filey Bay" (the first of a series on kindred subjects communicated to this Society extending over many years).

It happened that the year 1881 was not only famous as the Jubilee of the British Association for the Advancement of Science, but the meeting was held in York, the city in which the Association was founded in 1831. The rally made by geologists, under the presidency of Professor (afterwards Sir A. C.) Ramsay, was truly remarkable, and the geologists of Yorkshire, amongst whom was G. W. Lamplugh (then 22), attended in force and gave it their whole-hearted support. Lamplugh's contribution to the splendid list of papers read in Section C was "On the Bridlington and Dimlington Glacial Shell-beds" (*Geol. Mag.*, 1881, pp. 535–46), with an excellent section of the cliff and lists of the Mollusca by Dr. J. Gwyn Jeffreys, of the Foraminifera by T. Rupert Jones, W. K. Parker, and Dr. H. C. Sorby. The recurrence of many papers on the Bridlington shell-beds is not merely due to their great importance, but to the fact that these beds are only occasionally seen, being almost constantly "masked" by masses of shingle and sand piled above them by the wind and tides, and moreover they are being gradually but *permanently* lost to sight by the construction of additional sea-walls to prevent the encroachment of the sea upon the cliffs. But for Lamplugh's long *residence on the spot*, their latest history would probably never have been written.

Lamplugh's first paper read before the Geological Society of London, in February, 1884, was on a recent exposure by storms of the shelly patches in the Boulder-clay at Bridlington in the winter of 1882–3. The mollusca, examined and determined by Dr. J. Gwyn Jeffreys, had been increased from 67 to 101, five of the additions being new to science; the Cirripedia were also determined by Mr. E. T. Newton and Foraminifera by Dr. Crosskey.

This year marked a determinative step in Lamplugh's life (he calls it his "wander-year"), for in it he started on a year's tour in North America for the purpose of increasing and enlarging his

¹ The history of the Bridlington Crag is given in a paper by the late Dr. S. P. Woodward in this journal, Vol. I, p. 49, 1864, which records details of the various early investigators and a list of the shells in this deposit compared with the Coralline Red and Norwich Crag, the Glacial deposits, and living species.

geological and general knowledge. The philosopher says "know thyself"; geologists say "know the world", and to do this a man must travel, travel, travel. He must possess also the trained eye and the retentive memory of the intelligent observer. After some study of drifts in the Eastern and North Central States, Lamplugh drifted gradually westward to the Pacific Coast, Vancouver Island, and Alaska. In winter he journeyed south to the Mexican border and as far as New Orleans. Afterwards he described a visit to the Muir Glacier in *Nature* and some features of glaciation observed in Vancouver Island in the Proceedings of the Yorkshire Geological and Polytechnic Society and in the Quarterly Journal for 1886.

On returning home Mr. Lamplugh took up with his accustomed activity his old geological exploration of the Yorkshire coast,¹ and especially devoted his attention to the subdivisions of the Speeton Clay. His notes on this formation in the Excursion Guide prepared for the London meeting of the International Geological Congress in 1888 brought him into personal association with several distinguished Continental geologists, who visited Speeton under his guidance, and led him to communicate an important paper on the subject to the Geological Society in March, 1889. This paper gave the results of a long series of observations made by him, during favourable opportunities, at the cliff foot and on the beach at Speeton from 1880 to 1889. As the result of his exhaustive labours he was able to show, on stratigraphical and palæontological evidence, that there is probably at Speeton a continuous series of clays from the Jurassic to the Upper Cretaceous, and that the deposition of these beds had gone on contemporaneously with the erosion of the beds inland.

This exploration of the Speeton Clay attracted the particular attention of the Russian geologist Professor Dr. Alexis P. Pavlow, of the University of Moscow. A critical study of the fossils by Professor Pavlow gave rise to a joint paper on the Speeton Clay and its Equivalents by A. Pavlow and G. W. Lamplugh.² In it the authors showed by comparative stratigraphy, and on the evidence of the Mesozoic Cephalopods from Russia, this, and other countries, the different "zones" into which the Speeton and Russian beds have been divided, and the actual sequence from the Kimmeridgian to the Aptian.

In the award to Mr. Lamplugh of the "Lyell Geological Fund" by the Council of the Geological Society in February, 1891, the President, Sir A. Geikie, referred to his valuable researches among the Glacial deposits of Yorkshire, and particularly to his investigation of the Speeton Clay, as a striking example of the results obtained by long and patient labours of an observer resident on the spot with unusual facilities to examine and study the beds.

In 1892 the opportunity so long awaited was afforded Lamplugh to join the Geological Survey as an Assistant Geologist, and, as

¹ He once described himself as "a coastguard" in the service of geological science.

² Published in the Bull. Soc. Imp. Nat. Moscou with 11 plates (Moscow, 1892); see also *GEOL. MAG.*, 1892, pp. 422-6.

evidence of the high opinion held by the Director of his qualifications, he was sent to survey the Isle of Man, a task in which he was occupied for the greater part of the succeeding five years. The results of this period are embodied in his papers to the volumes of the Quarterly Journal and the Survey Memoir on the Isle of Man.

It is not often that one geological surveyor has the pleasure and satisfaction of seeing his name recorded as having written a memoir entirely by himself. The late Professor J. W. Judd when on the Survey many years ago claimed to have completed a whole English county, that of Rutland, but Mr. Lamplugh surveyed a whole island; nay, more, for was not Man a kingdom in itself up to 1765, when the Duke of Athol ceded his rights as Lord of Man to the Crown; but it still has its own Parliament (the House of Keys). Three-fourths of its whole area of 227 square miles (145,325 acres) is probably of Upper Cambrian age, whilst borings through Glacial drift have revealed a rock-floor of Triassic, Permian, and Lower Carboniferous strata below sea-level. Besides its valuable mines of silver-lead ore, its shell-marl and peat deposits have yielded many remains of the "Gigantic Irish Deer" (including an entire skeleton now set up in the Castle Rushen Museum, Isle of Man), which animal Mr. Lamplugh suggested may have crossed over to Man upon the ice towards the close of the Glacial period!¹

A brief leave of absence having been granted him, early in 1893 Mr. Lamplugh paid a flying visit to Arizona and the Pacific Coast of America and had a glimpse of the Grand Cañon of the Colorado.

Four years later, having been appointed Secretary of Section C (Geology), he attended the meeting of the British Association held in Toronto, Canada, and he joined an excursion across the Dominion to Vancouver Island under the guidance of Dr. G. M. Dawson, F.R.S., an account of which he published in *Nature* for November, 1897. In 1898 Mr. Lamplugh removed to Tonbridge to take part in the mapping of the Weald in conjunction with the examination of the borings and sinkings for coal then in progress in Kent (see memoir with Dr. Kitchin on Kent Mesozoic Rocks, 1911).

In 1901 the Council of the Geological Society awarded to him the Bigsby Medal (the "young man's medal"). In handing it to Mr. Lamplugh the President, Mr. Teall, said: "The Council feel that they are placing it in safe hands. You have done much, and they confidently expect that you will do more":—a trust which has since been honourably fulfilled by the recipient.

Having been appointed "District Geologist" in 1901, Mr. Lamplugh was sent to Dublin in charge of the Irish branch of the Geological Survey, in which post he remained until the Survey was transferred to an Irish department and placed under the supervision of Professor Grenville A. J. Cole, F.R.S., in 1905. During the period of his residence in Dublin Lamplugh superintended and took part in the mapping of the country around Dublin, Belfast, Cork, and Limerick, and issued four memoirs dealing with these areas.

¹ Another skeleton of *Cervus megaceros*, discovered in the Isle of Man in 1819, was presented to the Edinburgh Museum by the Duke of Athol. Many other remains of the same deer have been met with from 1798 onwards (see Geol. Surv. Mem., 1903, pp. 377-88).

In 1905 Mr. G. W. Lamplugh was elected a Fellow of the Royal Society, and in the same year he undertook, under the auspices of the British Association, the examination of the almost unexplored gorge of the Zambesi below the Victoria Falls, one of the grandest features of natural scenery to be met with on the African Continent. "It is difficult," says Mr. Lamplugh, "for anyone standing on the brink of the chasm, after having seen the placid flow of the Zambesi above the Falls, to believe that the fissure into which the river is so suddenly precipitated had been formed gradually by the action of the river itself, and not by some great convulsion during which the very crust of the earth was rent. The narrowness of the abyss, the strange zigzags along which the tumultuous waters rush, after their first great plunge, the mystery which has long surrounded the further course of the river after it swings away out of sight among its forbidding precipices, and the knowledge that the rocks across which it plunges are of volcanic origin are all factors that have aided the illusion." The conclusion arrived at by Mr. Lamplugh after examining the river carefully was quite in agreement with that already advanced by Mr. A. J. C. Molyneux that the prevalent idea of a sudden rent of the earth's crust was inadequate to explain the phenomena observed around the Falls, but was compatible with the view that the river has slowly sunk its channel into the hard rocks which have barred its passage seawards, while evidence afforded in other parts of the world sufficiently proves that canyons of even more impressive dimensions than the Zambesi have been carved out by the erosive agency of water acting through very long periods of time.¹

In the following year Mr. Lamplugh was elected President of the Geological Section of the British Association in York and delivered an address on "Interglacial Problems".

Upon his return from Ireland he took charge of the survey of the Midland District (Nottinghamshire, etc.), and shared as writer and editor in the publication of several memoirs (see list). Subsequently he superintended the field-work in the North Wales district, the full results of which are not yet published.

In 1910 Mr. Lamplugh attended the meeting of the International Geological Congress at Stockholm; and previously to the meeting he joined with other noted geologists in an expedition to Spitsbergen, of which some account was contributed to *Nature* (December 1, 1910) and a description of a striking shelly moraine seen there to the Proceedings of the Yorkshire Geological Society for 1911.

After the retirement of Mr. Horace B. Woodward, F.R.S., in 1908 the administrative work of Assistant Director of the Survey was taken up by Dr. A. Strahan, F.R.S., until his promotion to the Directorship in 1914, when Mr. Lamplugh became Assistant Director.

In the latter year he made one of the distinguished band of geologists who represented our science on the occasion of the holding of the British Association in Australia (in August, 1914)

¹ A paper read before the British Association for the Advancement of Science, meeting in South Africa at Johannesburg, August 30, 1905. See also the *Official Guide to the Falls*, 1905, and the *GEOLOGICAL MAGAZINE* for December, 1905, pp. 529-32.

under exceptional facilities arranged by the Australian Governments. Not long after their arrival in the Commonwealth came the serious intelligence that war had been declared with Germany, a misfortune which overshadowed the programme and marred the closing stage of the meeting. Mr. Lamplugh was fortunately able, owing to the kindness of officials everywhere, to see much of the country, particularly in Western Australia, before the outbreak of war, under the guidance of Mr. Harry P. Woodward and Professor Woolnough.

Mr. Lamplugh is "no stranger in our midst", but is well known and highly esteemed in the scientific world, having been a Geological Surveyor for twenty-six years, and served upon the Councils of the Royal Society (1914-16), the Royal Geographical Society, and the Geological Society (1906-10, a Vice-President 1909-10, 1917), and is now its President (1918). As a Yorkshireman he keeps up his interest in all the amateur geological activities in the county. He is a past-President of the Yorkshire Naturalists' Union, the Hull Geological Society, and the Hertfordshire Natural History Society; and is an Honorary Member of the Rhodesian Scientific Association, the Yorkshire Philosophical Society, the Natural History and Antiquarian Society of the Isle of Man, and the Nottingham Naturalists' Society.

One who has worked with G. W. Lamplugh in the field and on the Survey and known him for some years writes:—

"If I were compelled to compress into three words my impression of Lamplugh's character, the ones I should choose would be courage, determination, and consistency—the courage which spurred him to break the current of his life and divert it to the work he loved and knew he could do best; the determination with which he has mapped out his career, passing through each objective to the next and never allowing an opportunity or experience to pass by unused; and the consistent high purpose which has guided the quality of his work, whether in the drifts, the Speeton clays, the Trias, or, that fool's paradise for geologists, the Isle of Man.

"These are the qualities which one sees in the field. A keen and accomplished observer as any glacial geologist must be or become, he has the elasticity of mind which enables him to turn to the discrimination of obscure igneous or metamorphic rocks, to the determination of ammonites or belemnites, or to the registering of those minute features of landscape which tell the history of physiography. Only here we must add the physical fitness for hard and steady work, and the disciplined imagination which have made the story of the Zambesi, or the glacial history of the Isle of Man, read like a fairy tale.

"But it is when the day's work is done and there 'creep out the little arts that please' that we discover the man of wide reading and liberal culture, of broad knowledge of places, men, and things, of deep convictions and serious thought. Then, if not before, we find the merciless critical faculty which takes nothing for granted, the insight which looks down into the heart of things, and the intolerance of sham and shoddy, which, seeking good in all, cannot shut its eyes to the evidence that all is not always for the best.

"Although he has undoubtedly read the hundred best books he has

by no means neglected the others, and, bringing to bear upon his great knowledge of literature, on its humane as well as its scientific side, a delicate perception and a nice and balanced judgment, he has become no mean judge of style and method. But the style that he appreciates must be the embroidery that accentuates worth and beauty and not that which is intended to hide deficiencies in both. It was no small triumph to have detected a new *de Rougemont* who had for the second or third time thrown dust into the eyes of those whose business it was to see clearly in matters of style.

“Keen as is his evaluation of books, his knowledge of men is not less well founded nor his judgment less sound. Having travelled far he has made a wide circle of acquaintances of varied sympathies and interests, and has met them under circumstances which favour close intimacy. To discuss men with him is as entertaining as to discuss books, for he has studied the man as well as his work, has seen the weak spots as well as the strength, and has the faculty of expressing his opinions with a slightly malicious but always good-natured humour which gives them a delightful if subacid flavour.

“If one might be allowed three more epithets they would be—as a geologist, *sound*; as a man, *human*; as a friend, *lovable*.”

Mr. Lamplugh's large knowledge and wide experience in our science is always at the service of geologists who seek his kindly help. He is without pretence and rather too retiring, but—as he is only 59—that may be remedied as he grows older and has longer intercourse with his fellow-hammerers. We offer him our sincerest good wishes for his Presidency of the Geological Society, and he will also carry our warm regard with him for the term of his natural life.

H. W.

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 1911. The Mesozoic Rocks in some of the Coal Explorations in Kent (with F. L. KITCHIN). 8vo. pp. 212, with 5 pls. and 5 figs. Wrapper, 3s. 6d.
 1914. Water Supply of Nottinghamshire (with B. SMITH). 8vo. pp. 574, 2 coloured maps, and 2 figs. Wrapper, 5s.
 1917. Summary of Progress for 1916: Appendix III, On a Deep Boring at Battle; App. IV, The Underground Range of the Jurassic and Lower Cretaceous Rocks in East Kent, pp. 40-52.

CONTRIBUTIONS TO THE FOLLOWING SHEET MEMOIRS.

1899. Geology of the Borders of the Wash.
 1903. Geology of the Country around Chichester.
 Geology of the Country around Dublin.
 1904. Geology of the Country around Belfast.
 1905. Geology of the Country around Cork and Cork Harbour.
 Geology of the Country south and east of Devizes.
 1907. Geology of the Country around Limerick.
 1908. Geology of the Country between Newark and Nottingham.
 Geology of the Country around Oxford.
 1909. Geology of the Melton Mowbray district and S.E. Nottinghamshire.
 1911. Geology of the Country around Ollerton.
 1913. Geology of the Northern Part of the Derbyshire Coalfield, etc.
 1915. Geology of the Country between Whitby and Scarborough, 2nd ed.

II.—NOTE ON A HYPERSTHENE ANDESITE FROM PITCULLO, FIFESHIRE.

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TWENTY-ONE years ago Dr. Flett in a valuable paper (*Trans. Edin. Geol. Soc.*, vol. vii, 1897) described an exceedingly beautiful hypersthene andesite from the volcanic series of the Lower Old Red Sandstone at Dumyat in the Western Ochils. In the following brief communication I propose to give a short petrographic account of a strikingly similar rock that has occurred to me in the field in a more easterly portion of the same range of hills and which is of the same geological age.

In East Fife the volcanic rocks of the Lower Old Red Sandstone rise abruptly above the southern shores of the Firth of Tay. They consist here as elsewhere of lavas, tuffs, volcanic breccias, and agglomerates, with intervening belts of sediment that no doubt