

OBITUARY

W. G. FEARNSIDES

William George Fearnside, who died on 15th May, 1968, at the age of 88, was the first occupant of the Sorby Chair of Geology in the University of Sheffield and an outstanding geologist of remarkable versatility, especially in the fields of applied science. A native of the West Riding, he was born at Horbury, near Wakefield, in 1879, and was educated at the Wheelwright Grammar School in Dewsbury. At Cambridge he was a scholar of Sydney Sussex College and obtained a first-class degree in Geology and the Harkness Scholarship. A fellowship at his college followed in 1904 and in 1909 he was appointed as a University Demonstrator in Petrology.

While at Cambridge he studied the structure of metallic alloys, with Haycock and Neville, and made contributions to the local geology, but his principal work was on Lower Palaeozoic rocks. Perhaps his best known papers here are those on Arenig Fawr and Moel Llyfnant (1905) and the Tremadoc Slates (1910), together with an account of north and central Wales for the Jubilee volume of the Geologists' Association (1910). During this period he also produced a general work on the Ordovician of Scandinavia, and jointly with other Cambridge authors, studies on Pomeroy and the Lake District.

In 1913 Fearnside was elected to the chair at Sheffield and thereafter became a vigorous and influential figure in problems of applied geology in the Midlands and north of England.

In 1915 and 1916 he read two papers to the Midland Institute on "Some effects of earth-movement on the Coal Measures of the Sheffield District". The first of these dealt with the detailed problems of washouts in the coal seams while the second was concerned with the broad structures of the East Pennine Coalfield and was accompanied by the first structural map of this area. While the work on the coalfield was in progress the First World War broke out and many of the traditional sources of raw materials essential to the steel industry were cut off. He threw himself vigorously into the possibilities of remedying the resultant shortages and published several papers dealing with the problem. In 1917 communications were made on the mineral requirements of the British Iron and Steel Industries, the shortage of the supply of non-phosphoric iron ore and on supplies of refractory materials in the South Yorkshire Coalfield. These were later supplemented by

a paper on mineral supplies at Midland blast furnaces and one on native supplies of refractory materials available in the Sheffield district. Meanwhile his work as a petrologist had suggested ways in which scientific principles could be applied to industrial problems. In 1914 he gave the first Sorby Lecture on some structural analogies between igneous rocks and metals, and about the same time became interested in the changes that take place during the firing of refractory materials and during their use in the furnace. It later became apparent that there was scope for much further work in this field and in 1917, with the help of W. J. Rees, he started in the University the Department of Refractories which has since made significant contributions to the development of the industry.

Throughout his career Fearnside had very wide-ranging interests. He was responsible for the establishment of several important water supply schemes and, turning to oil, made a journey to India and Burma to investigate the structure of oilfields. He was also interested in metallic ores and in 1956, at the age of 76, went to Northern Rhodesia to investigate deposits of manganese ores. The coming of the Second World War found him engaged in coalfield work in North Staffordshire which continued till after his retirement from the chair in 1945. His work was by no means finished and, with the nationalization of the mines, he was appointed consultant to the West Midlands Division of the National Coal Board; in this capacity he supervised an extensive exploration which resulted in the development of an important new coalfield. This work continued till his 80th birthday, when he was retired by the N.C.B. After this he still concerned himself with a variety of problems, including the siting of the new Lancashire-Yorkshire motorway with which he was engaged till shortly before his death.

As would be expected in one of his gifts and industry, Fearnside was prominent in many scientific societies and many honours came his way. He received the gold medal of the Surveyors' Institution following a paper on Macadam road construction in 1913, and the Greenwell Medal from the North of England Institute of Mining and Metallurgy. In 1933 he was President of Section C of the British Association and gave a notable address on the structures of the Midland Coalfields. 1932 was marked by election to the Royal Society and the award of the Murchison Medal of the Geological Society of London; he was President of the latter from 1943 to 1945. In 1946 he was elected an honorary fellow of Sidney Sussex College. He was also an honorary member of the Institute of Mining Engineers.

On his arrival in Sheffield Fearnside became an active member

of our own Society, serving several times on Council and becoming President in 1934 and 1935. His presidential address on the "Framework of the South-East Pennine Coalfield" was published in 1936. In 1961 he presented a sum of money to the Society for the foundation of the Sorby Medal, awarded for distinguished work in, or by a person connected with, Yorkshire and the north of England. The present generation of members will probably recollect him most clearly for his pungent, acute contributions at meetings and in discussions; the same quick understanding and practical good sense played a valuable part in the business of Council. His especial position was recognized by election to Honorary Membership, which he held for nearly thirty years.

As a teacher Fearnside was inspiring; his lectures were brilliant and delivered with vigour, but it was in the field that he excelled. His powers of observation were unusually acute and no one who attended his field classes could have failed to have his wits sharpened for the appreciation of natural phenomena. His excursions were always energetic, in his younger days twenty or thirty miles were not unusual, and even up to his time of retiring he could walk as well as the best of his students. As a Yorkshireman should be, he was direct in his speech but was genuine, and would take great trouble to do a kindly deed. He had a lively mind and was excellent company; evenings spent with him on field excursions were always interesting and instructive. In 1911 he married Beatrix, daughter of Professor W. W. Watts, and had two daughters. The elder is married to Professor O. M. B. Bulman and the younger was killed while on service in Italy at the end of the last war.

W.H.W.

#### F. M. TROTTER

On 24th July, 1968, Frederick Murray Trotter died at his home at Awre, Gloucester, and the Society thereby lost one of its most eminent members and a Past President. This loss came a mere seven months after he had been awarded the Sorby Medal by the Society for "his distinguished contributions to geological knowledge of Yorkshire and the north of England", an award which illness prevented him from receiving in person.

Trotter was born on Tyneside in 1897, and attended Rutherford College, Newcastle-upon-Tyne. His university career at Armstrong College under Lebour was, like that of many of his generation, interrupted by war service. He enlisted with the Royal Engineers and lost an eye near Vimy in 1918, a particularly severe blow for one who had a talent for association football. His career as a field

geologist began when he joined the Geological Survey in 1921 and was posted to the newly-formed Cumberland Unit at Whitehaven under Bernard Smith. Here he was joined by S. E. Hollingworth, with whom he formed a life-long friendship that was fruitful for geological research. He was soon introduced to problems that occupied his mind for many years thereafter, for his official Survey work formed a springboard for private research.

At a time when the mapping of glacial deposits was shunned by many field geologists, Trotter's work on the drift of the Carlisle Plain served to arouse his interest in the phenomena that had caused it, with the result that both he and Hollingworth devoted much private time to the study of the glaciation of the Vale of Eden, taking the river as the boundary between them. Trotter concluded that on eastern Edenside there had been three glacial episodes, the Early Scottish and Main glaciations and the Scottish Re-advance. He showed that at the Main maximum a combined Lake District and Cross Fell ice-sheet filled all the Vale and covered much of the Alston Block, coalescing to the north with a Scottish ice-sheet. He worked out the directions of ice flow and mapped the complex series of drainage channels and outwash deposits that had formed in the retreat phase.

The work of Trotter and Hollingworth around Brampton led to their recognition that the Alston Block had been an independent tectonic unit since Devonian times, influencing structure, sedimentation and the development of drainage. In a paper on the latter aspect to the Society Trotter concluded that the present river system had developed by river capture from a number of eastward-flowing consequent streams cut into the peneplaned surface of the Block after its elevation and tilting in Tertiary times.

He noticed also the reddened Carboniferous beds beneath the Permo-Trias near the Scottish Border and on Edenside, and his interest in these eventually extended to similar rocks throughout north-west England. The work was summed up in his first presidential address to the Society, in which he drew a distinction between "red beds" of primary origin and those originally grey measures in which ferrous iron had been changed *in situ* by oxidation to ferric iron below an arid land surface. He suggested criteria by which secondary reddening might be recognized and pointed to the palaeogeographic conclusions that could be drawn from its occurrence. These ideas, supplemented by his experience in the West Cumberland and Forest of Dean iron ore fields influenced his theories on the emplacement of hematite orebodies in the Carboniferous Limestone of those areas.

Geology is an ideal ground for lively debate and Trotter loved to be in the thick of it. There can have been few more controversial discussions than that following his paper to the Geological Society of London on the devolatilization of coal seams in South Wales, in which he related the variation of rank in coal to a thrust-plane beneath the coalfield. Coal rank was also the subject of two of his papers to our Society, one of these being his second presidential address. The two papers together give a systematic account of the geological processes and chemical changes that take place during the genesis of a fuel series of rising rank from peat to anthracite; first by the loss of moisture, which he saw mainly as a result of the weight of superincumbent strata, and then by the driving off of volatile hydrocarbons under the influence of heat and tectonic pressure. A less well known aspect of his work on coal volatiles was his investigation of the relationship between mine gases and pneumoconiosis, a lung disease of miners.

Trotter served on the Council of the Society from 1947 to 1954 and was its President in 1951-52. He was also on the Council of the Geological Society of London from 1956 to 1959 and was awarded the Murchison Medal in 1956. As President of the Manchester Geological Association in 1951 he assisted in the amalgamation of its Journal with the Proceedings of the Liverpool Geological Society, and his presidential address—a comprehensive review of Namurian sedimentation in north-west England was published in the first joint issue. After serving as District Geologist, North-west England, he became Assistant Director, England and Wales, in 1956, retiring in 1962. Much of his work has proved to have lasting value, and has passed into the geological lore of northern England. But above all he was an economic geologist, and always insisted that geology was to be used as a tool in the national economy. Members of his old unit at Manchester will remember his concern to see that geological information was communicated to those who needed it for practical purposes such as mining, quarrying and engineering works. His friends will also remember with sympathy those difficult years for Trotter when his first wife suffered recurrent serious illnesses, and they are glad that he was able in later life to be happy in a second marriage.

B.J.T.