and other public authorities have accepted an increasing responsibility for the maintenance of technical institutions; and the companies, relatively impoverished by the War and confronted by many other urgent calls for financial assistance, have shown a tendency to restrict their educational expenditure. One of the unfortunate results of this economy has been the recent closing of the Finsbury Technical College.

There is a desire also on the part of some of the companies to restrict their interest in technical education to the crafts represented by the respective companies; thus, the Clothworkers' Company has subsidised the textile department of the University of Leeds by a capital sum of 220,000*l.* and an annual grant of 4000*l.*; the Drapers' Company has devoted 20,000*l.* to scholarships for the textile industries; and the Leathersellers' Company have expended more than 20,000*l.* for a building for the Leather Tanning College.

In the early days of the technical education movement, a strong feeling was expressed by Huxley and others that part of the wealth of the city companies could be used to great advantage for the assistance of technical education. The educational deficiencies of

the British workman were the first object of solicitude, and the provision of purely craft training still retains an important place in schemes of technical education. Developments in engineering, in the use of electricity, and in many other industries based on science, brought a demand for more specialised training, a demand which, in respect of civil, mechanical and electrical engineering, has been admirably met by the City and Guilds (Engineering) College.

The College has been loyally served by many distinguished professors and instructors and has rigorously maintained a high efficiency in all its work. No college can be trusted more implicitly to ensure proper standards of education and training in the award of degrees and diplomas. The College has sent out a large number of well-trained engineers to all parts of the world, and the Duke of York was well advised that he may expect to meet many City and Guilds men during his forthcoming Imperial tour. It will afford great satisfaction to all friends of engineering education that the College, thanks mainly to the generosity of the Goldsmiths' Company, has acquired this important addition to its equipment.

Obituary.

MR. G. W. LAMPLUGH, F.R.S.

BY the death of George William Lamplugh on October 9, British geology has lost one of its ablest exponents. Born at Driffield on April 8, 1859, he was educated at private schools, but spent the latter part of his boyhood at Bridlington, where the absorbing interest of the Yorkshire coast stimulated his natural bent for geology. Here arose a question, the answer to which was to determine the course of his future life. He had actually embarked upon a commercial career with geological work as a recreation. On one hand lay lucrative posts with the possibility of affluence; on the other, scientific research with a small competence. He considered the matter with characteristic deliberation; the possibility of affluence appealed to him not at all; he decided in favour of a life of research as soon as he was satisfied that the competence, if small, would suffice for his modest needs. In 1892 he joined the staff of the Geological Survey.

Lamplugh's first paper was published in the *Geological Magazine* in 1878 when he was nineteen years of age. In this and several papers which followed in the next few years, he described the sequence of beds which constitute the glacial drift of the Yorkshire coast, and the occurrence of marine shells, more or less fragmentary, in them. He noted also the drawn-out remains of a pond deposit crowded with the freshwater shell *Limnæa peregra*, which occurred as lenticles in the boulder clay. At that time marine shells in the glacial drift were held by many to betoken submergence. Lamplugh then, as always, formed his own conclusions. Of the Bridlington Crag he writes that it is "probable that its great thickness and amassed appearance may have been due to the accumulating power of a huge mass of ice, which, grounding (and not, as with the smaller bergs, merely grating) on a soft bottom, would slowly continue its forward course for some distance . . . and might push before it a constantly increasing mass of sand and shells"; and again: "the movement of ice

at one time on a soft sea-bottom and, at another, over the silty bed of a pond, has produced precisely similar effects." More than thirty years later I was with him and shared his excitement on seeing the process of transportation he had pictured, actually in operation in Spitsbergen.

The more important part of Lamplugh's work in those early years lay, however, in his study of the Speeton series and of his comparison of it with the Tealby series of Lincolnshire. He approached the subject from a thoroughly scientific point of view, bringing to bear an intimate knowledge of the fossils, acquired apparently and not taught, as well as detailed field-work. One of the results was to show "that in Lincolnshire, as in Yorkshire, the various species of belemnites present in the rocks afford the most natural and convenient means for classifying the strata; but that the well-defined zones which they form do not always coincide with the lithological divisions." This work attracted the attention of Prof. Alexis Pavlow, of the University of Moscow, and led to a joint paper on the correlation of the Upper Jurassic and Lower Cretaceous horizons of Speeton with their equivalents in Russia and other parts of Europe.

In 1892, as a member of the staff of the Geological Survey, Lamplugh commenced official duties which were to occupy nearly all the remainder of his life. He was entrusted soon after his appointment with the geological surveying of the Isle of Man. Except for a few weeks, during which I accompanied him for the purpose of initiating him in survey methods, he accomplished this great work single-handed. The range of problems which confronted him was prodigious, including as it did the sequence and structures of the older palæozoic rocks, the mapping of the newer palæozoic rocks and of the Trias, the great suite of igneous rocks, both contemporaneous and intrusive, an extraordinary development of glacial deposits, and lastly, mining developments that had once been of much importance. Some of

these lay outside the scope of his previous experience, but on all he brought to bear a judgment founded on the deliberate and exhaustive consideration of a problem from every point of view that was characteristic of him. Incidentally, I am reminded that we disagreed on the interpretation of the small tract we mapped together. I thought that certain structures in the volcanic rocks of Scarlet Point might be attributed to the turmoil of the eruption. He took the view that they were due to subsequent overthrusting. Which was right I do not know. The Isle of Man occupied him for five years. His memoir upon it, with its wealth of records and of original observations, takes rank as a classic in modern geology.

In 1901 Lamplugh was placed, as a district geologist, in charge of the Irish branch of the Geological Survey. He remained in Dublin until that branch was transferred to an Irish Department in 1905, and during his stay took part in the mapping of the country round Dublin, Belfast, Cork, and Limerick, turning his experience of glacial phenomena to great advantage. On his return to England he served as district geologist for the Midland district and afterwards for North Wales. Administrative duties took up much of his time, but he contributed to and edited several memoirs. Later on he was engaged in surveying part of the Wealden area and became concerned with the borings which were then being made to prove the extent of the Kent coal-field. The records of the boreholes were obtainable only under much difficulty, and many of them until they were interpreted by him were unintelligible. They revealed developments of the Secondary strata that differed from any known exposures, and when accompanied by the palæontological observations made by his colleague Dr. Kitchin, threw a new light on the Secondary geology of southern England. In 1903, with the late J. F. Walker, he wrote "On a Fossiliferous Band at the top of the Lower Greensand near Leighton Buzzard." The conclusions formed were not accepted by palæontologists, on the ground that the fossils were characteristic of a higher stratigraphical horizon and could not be in place. The beds, it was argued, must have been inverted, presumably by glacial agency. Lamplugh's last paper, in the *Quarterly Journal of the Geological Society*, in 1922, was devoted to a detailed account of all the sections in which the band had been recognised. He showed that the sequence originally described by himself and Walker has invariably held good in every successive exposure and over a large area. He did not regard the palæontological evidence as conclusive, and considered the suggestion of inversion to be untenable.

It was Lamplugh's desire to continue his work on the Lower Cretaceous rocks after his retirement from the Geological Survey in 1920, but it was not long before failing health rendered it impossible. In 1914 Lamplugh had been appointed assistant director for England and Wales. He held the post until his retirement. Never could there have been a more loyal colleague than he was to me.

Lamplugh loved travelling, but always with the view of increasing his geological experience. In 1884 he visited the Eastern and Central States of North America, Vancouver, and Alaska, and went southwards to the Mexican border and as far as New Orleans. In

1893 he saw the Grand Cañon of the Colorado, and in 1897 attended a British Association excursion to Vancouver. In 1905 he made a systematic examination of the gorge of the Zambezi, below the falls. "It is difficult to believe," he writes, "that the fissure into which the river is so suddenly precipitated has 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." He was able, nevertheless, to find conclusive proof that the gorge was due to the erosive action of water as the river gnawed its way back into the heart of the continent, a view that had been put forward by Molyneux. In 1910 he attended the International Geological Congress at Stockholm and took part in an excursion to Spitsbergen. There, under the leadership of Baron De Geer, we were shown not only a magnificent development of Tertiary, Secondary, and Upper Palæozoic rocks, but also shelly drift in the process of manufacture. His last trip was to Australia, for the meeting of the British Association in 1914.

Lamplugh received several honours, but, if I may say so without breach of confidence, declined some through a somewhat over-sensitive modesty. In 1891 he was awarded by the Geological Society a half of the Lyell fund in recognition of his work on the Yorkshire coast, and in 1901 he received the Bigsby medal as an acknowledgment of the value of his researches on the Speeton series. In 1925 he was awarded the Wollaston medal, the highest honour in the bestowal of the society. He became a fellow of the Geological Society in 1890, served several times on the council, partly as vice-president, and was president in 1918-20. He was elected to the Royal Society in 1905, and served on the council in 1914-16. He was for a time secretary of Section C of the British Association, and was president of the section in 1906. He was past-president of the Yorkshire Naturalists' Union, of the Hull Geological Society, and of the Hertfordshire Natural History Society, and an honorary member of several other societies.

Lamplugh's work was characterised by thoroughness of observation and by his habit of devoting prolonged consideration to a subject before forming conclusions. Though an original thinker, he never advanced a view that he was not able to support by sound evidence. He was a wide reader, mainly of a class of literature that makes no appeal to the multitude, and had acquired a critical judgment of style. In his own writing he took infinite pains to express his exact meaning, and expected this of others. As a colleague he was loyal; as a friend, lovable. A. STRAHAN.

DR. PAUL KAMMERER.

THE family Kammerer is of Saxon descent. The ancestors migrated first to Transylvania, and from there to Lower Austria and Vienna. Here Paul Kammerer's father erected a manufactory for scientific instruments. Paul Kammerer was born on August 18, 1880, studied at the University of Vienna in 1899-1904, took the degree of doctor in philosophy on June 23, 1904, and got the *venia legendi* for experimental morphology at the philosophical faculty of this same University. Having been a member of the staff