matters little". On April 1 the Geological Survey had been finally taken away from the Master-General and Board of Ordnance and placed "under the direction and supervision of the First Commissioner of Her Majesty's Woods, Forests, Land Revenues, Works and Buildings". The most important geological book of the year was the fine volume by Murchison and his associates, "The Geology of Russia in Europe and the Ural Mountains", dedicated to the Czar and containing coloured gold pin-pointed maps showing the mineral deposits from the northern extremity of the Urals to the Donetz Basin.

Experimental science still languished at Oxford and Cambridge, and in spite of the work of Graham at University College and of Daniell at King's College, London was sadly in need of chemical laboratories. Largely through the Prince Consort, this need was met in 1845 by the opening in Oxford Street of the Royal College of Chemistry, where twenty-six students gathered to sit at the feet of a young *privat-docent* from Bonn, August Wilhelm Hofmann. In those far-off days, there was no talk of "blood and iron", "mailed fists" or "racial superiority", and there was free and friendly intercourse between German and British men of science, to the great advantage of both. Hofmann remained in London until 1864, but he came back later, his last appearance being in 1884, when he presided over the dinner given in honour of one of his most famous pupils, William Henry Perkin.

By 1845 the peace had lasted thirty years and there was money to spend on all sorts of projects. The railway mania had set in, and Robert Stephenson was returning big cheques sent to him more or less as bribes. Some half a dozen railway lines, including those between Bristol and Gloucester, London and Cambridge and Manchester and Sheffield, were opened during the year, and as the railways spread so did the electric telegraphs. For a shilling, visitors to Paddington or Slough could see "this interesting and most extraordinary Apparatus by which upwards of 50 SIGNALS can be transmitted to a Distance of 280,000 miles in ONE MINUTE". The best advertisement, however, was the announcement of the arrest at Paddington through the use of the telegraph of the Slough murderer John Tawell. For the first time, too, a newspaper published a report of a meeting transmitted by electricity. Two years before, Colt, of revolver fame, had laid a submarine cable in New York harbour, and in Britain the Bretts were dreaming of a cable between England and France. Sea transport was undergoing a revolution. Steam vessels were found everywhere, iron shipbuilding was becoming an industry, and the trials of H.M.S. *Rattler* in 1845 showed the pioneers that screw propulsion was possible for even the stately three-decker line-of-battleship. By the spring, the famous iron screw steamer *Great Britain*, once called the *Mammoth*, was nearing completion, and on April 23, 1845, *The Times* said: "Yesterday Her Majesty and Prince Albert paid their contemplated visit to this extraordinary vessel". Brunel had the honour of explaining everything to the Royal party, and Francis Pettit Smith, otherwise "Screw" Smith, presented "a very beautiful model in gold, in an appropriate case, of the propeller he had recently fitted to Her Majesty's new tender yacht Fairy". The *Great Britain* sailed on her maiden voyage on July 26, 1845, and so opened another chapter in trans-Atlantic travel.

OBITUARIES

Sir John Fox, C.B., O.B.E., F.R.S.

JOHN JACOB FOX, eldest son of Mark and Hannah Fox, was born in London on April 12, 1874, and died on November 28, 1944. He received his scientific education at the Royal College of Science, South Kensington, and at Queen Mary College, London, taking the B.Sc. degree by research in 1908 and the D.Sc. degree two years later. He was elected a fellow of the Royal Institute of Chemistry in 1916. He entered the Government service in 1896 and was appointed to the permanent staff of the Government Laboratory in 1904. He became superintending chemist in 1920, deputy Government chemist in 1929 and Government chemist in 1936.

During his official career, Fox was called upon to undertake work concerning a number of problems of interest not only to Government departments but also to the general public. Among these the following may be mentioned: the possibility of substituting for white lead either less-soluble compounds of lead or 'leadless' glaze; the causes of the decay of buildings; the pollution of rivers by drainage from tarred roads; the cleaning and restoration of wall paintings. His encyclopædic knowledge of organic chemistry and his sound judgment were called into play in organizing the sections of the Laboratory set up to advise the Board of Customs and Excise in the administration of the Safeguarding of Industries Act and of the duties on silk and artificial silk and on hydrocarbon oils. As Government chemist he was chairman of the Road Tar Research Committee and of the Committee on Physico-chemical Problems of the Building Research Board. In 1939 he threw himself with great energy into scientific matters connected with the prosecution of the War. This aspect of the work of his last years cannot yet be described in detail, but it can be stated that he served on numerous departmental committees and was a member of the Hydrocarbon Oil Duties Committee at the time of his death.

Fox found time to undertake a great deal of research. In his early years his mind turned to organic chemistry, and in this period he published researches in the acridine series and on the derivatives of 8-hydroxyquinoline and was joint author of the discovery of a new aromatic hydrocarbon diphenylene. Later he was interested in spectroscopy and its relation to molecular structure. The ultra-violet absorption spectra of alkaloids, sulphur, the halogens and light elements was studied. His work on the infra-red absorption spectra of diamond and of some carbon compounds, carried out in collaboration with colleagues in the Government Laboratory, led to the recognition of two types of diamond and to the elucidation of some difficult problems in analytical chemistry. Difficulties arising in his official work suggested researches on the solubility of lead sulphate in ammonium, potassium and sodium acetates, on mannito-boric acid and on the composition of some medieval waxes. He also published researches on new and improved methods of analysis.

Fox had a very alert mind, a photographic memory and abundant energy. In addition to the numerous research institutions to which he was appointed in his official capacity, he gave his time freely to the work of scientific societies. He was a past president of the Royal Institute of Chemistry, of the Oil and Colour Chemists' Association and a vice-president of

the Society of Chemical Industry. He served on the Council of the Chemical Society and was a manager of the Royal Institution. He always had at heart the welfare of Queen Mary College, its students and its old students. He was one of a small band of distinguished old students who met together several times a year to keep track of old members of the College and to give them a helping hand when necessary. He was made a fellow of Queen Mary College in 1937.

Fox was always willing to help: he never allowed red-tape to interfere with his official contacts with industry. He gladly saw the representatives of chemical manufacturers and other traders, and freely gave his knowledge and experience to help them to overcome those difficulties inseparable from governmental control. Although his whole life was devoted to the service of chemistry, he yet found time to act as treasurer of his church for many years. He was kind and generous to his colleagues and lost no opportunity of encouraging those young members of his staff who showed a lively interest in chemistry. His enthusiasm for chemistry remained to the end, when he could still be seen moving from room to room of the Laboratory—asking, suggesting, encouraging.

His services were rewarded by the honour of the O.B.E. in 1920, of the C.B. in 1938 and of a knighthood in 1944; his services to chemistry were acknowledged by the Royal Society in 1943, when he was elected a fellow. He leaves a widow, a son and a daughter.

A. G. FRANCIS.

Sir Percy Nunn

THAT so distinguished a career as that of Sir Percy Nunn should have terminated in a sort of banishment from his native land, and therefore from the scenes and causes to which he had devoted his eminent gifts, must indeed be accounted a tragedy. So long as he was able to spend a few summer months in England, after many months of exile to Madeira for reasons of health, his lot seemed tolerable. But the grim course of world events meant for him complete exile, a condition which, however, his nobility of character enabled him to bear with exemplary patience and fortitude. He died on December 12 at the age of seventy-four.

That Nunn was first of all, at least in the chronological sense, a man of science, is shown by his first substantial piece of writing, his "Aims of Scientific Method", and by his subsequent work on the nature and teaching of mathematics. It is scarcely too much to say, however, that even then, and still more decidedly later on, when he became an active member of the Aristotelian Society, he was essentially a philosophic thinker. The broad philosophic outlook characterized all his literary work. He wrote a book bearing the modest and not uncommon title "Exercises in Algebra". The book must have been a sore puzzle to teachers who had not got far from the 'Hall-and-Knight' tradition. It was, in fact, the result of years of teaching combined with reflexion, and finally of many months of patient and laborious research in the British Museum and elsewhere. It could not be a best-seller in the secondary schools, but it could, and it did, help towards a reorganization of school mathematics.

At a later stage in Nunn's career, he published his well-known "Education: its Data and First Principles", a work which summed up in brief compass the substance of his courses of lectures on the subject. That book, published two years after the end of the first world war, was, for one thing, a marvel of prophecy as to the shape of things to come. The author's main purpose was "to re-assert the claim of Individuality to be regarded as the supreme educational ideal, and to protect that ideal against both the misprision of its critics and the incautious advocacy of its friends". The book, remarkable both for its clear vision and its massive learning, still stands as the finest systematic defence of the only educational ideal which can make the world safe for democracy.

Some of Nunn's old friends will remember how, as vice-principal of the new London Day Training College, he was introduced to them nearly forty years ago, by the principal, the late Sir John Adams, in a rather dingy little room near Holborn which formed the temporary headquarters of the College. These were the roots, the fruits of which are seen to-day in the great University Institute of Education. That development was mostly due to the creative genius of one man, and that man was Percy Nunn. No longer is it necessary that teachers in the British Commonwealth of Nations should go to the United States if they wish to pursue advanced studies in education. They can now get what they want in England, thanks to the efforts of Sir Percy Nunn, and to those of his singularly appropriate successor, Sir Fred Clarke.

As the advocate of a cause, Nunn was a persuasively quiet and eloquent speaker. There was a marvellous flow of language, but every word told. He was a true and loyal friend and a delightful companion, and in his exile he liked to recall in his letters the days of small things in a distant past.

T. RAYMONT.

Mr. J. Edmund Clark

JAMES EDMUND CLARK died on December 16 at the age of ninety-four. He was the last of the fourteen children of James and Eleanor Stephens Clark. His father died at the age of ninety-four, and the average age of his nine brothers and sisters who reached maturity was more than eighty-two when they died. His mother was one of a family of seventeen children.

Clark was educated at Bootham School, York, at University College, London, and at the University of Heidelberg. He returned to the famous Quaker school for boys at York as junior master during 1869–72, and after further training, he succeeded his life-long friend, later Prof. Silvanus P. Thompson, as science master at Bootham in 1875. After twenty-two years as a schoolmaster, he gave it up, largely because of deafness, and went to London in 1897, where he began a new career as export merchant. He retired in 1929.

Keenly concerned as Clark was for every branch of natural science, it was meteorology and phenology which particularly claimed his interest. For twenty-five years he was secretary of the Phenological Committee of the Royal Meteorological Society, and was for long a member of the Society's Council. High tribute was paid, when he retired in 1936, to his services to phenological studies on the effect of climatic conditions on natural phenomena.

In 1879 Clark married Lucretia H. Kendall, of Boston, Mass. She died in 1937, as did also their only son, Roderic. Throughout his life, Clark was a devoted and active member of the Society of Friends in York, Croydon, Purley and Street.