

and certain execution: one gets the impression that in using the apparatus there will be no need for successive trials in order that an essential adjustment or observation may be secured. Two examples of this must suffice.

One of the difficulties in the construction of etalons for such an apparatus is in securing that the lengths are exact multiples of the shortest one. Instead of relying on trial and error polishing of the ends, the etalons at the National Physical Laboratory are adjusted by four strain wires symmetrically disposed around the etalon, by means of which changes in length of any etalon of so much as 1 part of 25,000 can with certainty be produced without exceeding the elastic limit of the strain wires.

Again, not only must the supporting mechanism of the longest etalon be capable of the very accurate parallel displacements which are necessary, but such displacements must also be made with certainty and convenience and without varying the distribution of load on the supporting pillar and so forth. The means whereby this manipulation is secured are worthy of special attention.

It is a matter for great satisfaction that the Board of Trade together with the National Physical Laboratory decided to place metrology in the British Empire on a wave-length basis; and the designers and the workshop personnel of the National Physical Laboratory are to be congratulated on the successful completion of the first part of the programme.

Obituary

LIEUT.-COL. J. STEPHENSON, C.I.E., F.R.S.

WE regret to announce the death, which occurred in London on February 2, of Lieut.-Col. John Stephenson. He was born in 1871 at Padiham, Lancashire, and was educated at the Burnley Grammar School and the University of Manchester, where he had a distinguished career as a student in science and in medicine. After graduating, he acted as house-surgeon in the Manchester Royal Infirmary and in the London Hospital for Diseases of the Chest. In 1895 he was appointed to the Indian Medical Service and for the next five years was on military duty, including service in the North West Frontier Expedition of 1897. During the following years he was on plague duty and held various appointments as civil surgeon in the Punjab until in 1906 he became professor of biology in Government College, Lahore, of which he was appointed principal in 1912.

In Manchester, Stephenson had studied zoology for two years under the stimulating influence of Prof. Milnes Marshall, and with this foundation he instituted in Lahore instruction in the subject which reached a high standard and within a few years resulted in a productive school of zoology. Several of the students from his laboratories, whom he inspired with his own ideals of critical work and with the need for the investigation of the fauna of their country, are now holding influential zoological posts in India and have published important papers on their researches. His tenure of office in Lahore was marked by conspicuous success as a teacher and by high administrative qualities, and his quiet, effective personality left a deep and lasting impression on his students.

Stephenson resigned his post in Lahore in 1920 and I was fortunate in being able to attract him to the University of Edinburgh, in which he was appointed lecturer in zoology, to share in conducting the courses on invertebrates for senior students. His teaching was clear and concise, with a wide scientific outlook, and he was unsparing in giving

help and encouragement, especially to those who were reading for honours in zoology. In Lahore, immediately after taking up his duties, Stephenson began investigations on the aquatic oligochaetes of the Punjab and during the next ten years published a series of papers on these worms. His interests then widened to the oligochaetes in general and he examined numerous collections from various parts of India. These studies were continued with great assiduity in Edinburgh and in 1923 he published the important volume on the oligochaetes in "The Fauna of British India" and became recognised as one of the two chief authorities on the order. Before he resigned his lectureship in Edinburgh in 1929, he completed the masterly monograph on the Oligochæta which was published early in 1930 by the Clarendon Press. Stephenson's mastery of the structure and classification of oligochaetes, his extensive knowledge of the literature and his flair for conciseness and clearness in presenting facts and conclusions, enabled him to produce a monograph of exceptional merit which contains also conclusions of general interest; for example, on the bearing of the known facts of geographical distribution on the former existence of a more extensive antarctic continent and of Indo-Australian and other land-bridges, on convergence and on polyphyly. Stephenson was appointed in 1928 editor of "The Fauna of British India" in succession to the late Sir Arthur Shipley.

On leaving Edinburgh in November, 1929, Stephenson went to reside in London and continued his investigations on oligochaetes as an unofficial worker in the Natural History Museum until about two months ago. Two years ago he became zoological secretary of the Linnean Society and took an active part in its affairs.

Stephenson was the author during the last twenty-seven years of numerous papers on Oligochæta. His contributions to the advancement of knowledge were recognised by the award in 1920 of the Keith Medal of the Royal Society of

Edinburgh and by his election in 1930 as a fellow of the Royal Society of London.

Stephenson regarded as a recreation his studies, which were carried out with his usual thoroughness and care, in Persian and Arabic history and literature. He published the text, with translation, and with commentary or annotations, of two works, the second of which (Royal Asiatic Society, 1928), the zoological section of the *Nuzhatu-l-Qulūb* ("Heart's Delight") was compiled by a Persian author about the year 1340 and gave a conspectus of zoological science of the time.

Col. Stephenson was held in high esteem as a sincere and loyal friend, for his sound judgment and for his readiness to help in all matters relating to the advancement of zoology in Great Britain and in India. His many friends will feel a deep sense of personal bereavement and will extend their sincere sympathy to Mrs. Stephenson.

J. H. ASHWORTH.

DR. JOHN THOMAS

JOHN THOMAS was born at Harlech in 1886 and died at his home at Wilmslow, Cheshire, on January 18, 1933. He obtained a scholarship at Barmouth County School as a boy and afterwards became a science student at University College, Aberystwyth; he entered at Trinity College, Cambridge, in 1908 with an 1851 Exhibition and, after taking his degree in 1910, was awarded a post-graduate research exhibition by the College.

Thomas soon showed notable talents as an organic chemist and published several papers on this subject while at Aberystwyth and Cambridge. In 1911 he joined the aeronautical section of the National Physical Laboratory as a research chemist and in the following year took up a similar position on the staff of the Nobel Explosives Co. at Ardeer. While at Ardeer he distinguished himself by investigations on novel and delicate explosive compounds which came into prominence during the War; his original experimental work on these and other subjects gained for him the degree of D.Sc. of the University of Wales.

In 1918, Thomas became chief chemist to the Solvay Dyes Co. which had just been founded by Mr. James Morton at Carlisle for the manufacture of fast dyes of the indanthrone group; these important essentials of the textile industry had not previously been made on a technical scale in Great Britain. When the original company was reconstituted as Scottish Dyes, Ltd., Thomas was appointed a director and soon after, in 1923, became the managing director. The manufacture of the fast vat dyes involved the translation of a delicate laboratory technique into large scale practise and for this work Thomas, as a skilful experimenter gifted with marked originality and breadth of view, was eminently suited. During the succeeding years, Thomas's name was attached to numerous patents for the preparation of new and improved vat colours and, as a result, the great works which Dr. Morton established at

Grangemouth on the Firth of Forth, now competes on equal terms with the German and Swiss producers of vat dyes. Scottish Dyes, Ltd., was absorbed by the British Dyestuffs Corporation and Imperial Chemical Industries, Ltd., in 1926; in due course, Thomas became joint managing director of the Dyestuffs Group of the latter organisation and held this position until the end.

Thomas was a master of his subject and combined with his experimental genius a fertility in expedient and an aptitude for organisation which are altogether rare; he was a happy and charming personality and a delightful companion. By his untimely death at the age of forty-six years the chemical industry has lost an outstanding figure and many of us have lost a very dear friend.

W. J. P.

MR. C. M. STUART

CHARLES MADDOCK STUART was a member of a large family with a remarkable record of strenuous endeavour combined with religious fervour and a roving disposition; one of his brothers was Canon of Canterbury, the recently deceased Dean of Carlisle was another; the late James Stuart, so well known at Cambridge, founder of the Mechanical School now the School of Engineering, was their cousin. I have briefly set out the family history, in an article in the February number of the *Journal of Education*, as an outstanding example of family heredity.

Stuart was born on September 25, 1857; he died on November 22, 1932. He was educated at Harrow and then entered St. John's College, Cambridge, of which later on he was a fellow. He paid attention chiefly to chemistry and took a first in the Natural Science Tripos in 1880. He next studied with Fittig at Strasbourg. Returning to England, he was first a master at Clifton College, afterwards at Newcastle-under-Lyne under Kitchener; finally, in 1888, he became head-master of St. Dunstan's College, Catford, S.E., then opened as a new school. He thus came into my neighbourhood and we were close friends from the beginning up to his death. My four sons were educated at the school. Prof. Andrade was one of his pupils; Oscar Faber, the engineer-architect of the new buildings of the Bank of England, was another; Mees and Sheppard, of photographic note, in connexion with the Kodak Co., were also trained at the school. The numbers rapidly rose to five hundred and the school soon became far the best in the Metropolitan area, probably in the country.

He was a keen mountaineer and a man of great physical vigour, as much at home with his boys at cricket and lacrosse as in the class rooms. He was an experimentalist from the beginning, greatly influenced by the exact training he had from Fittig. He is the only head-master I have known who acted as master of method throughout his school: every subject gained through his inspiration. His desire was to make his school suit