years B.P., and is thus comparable with the *Corbicula* beds (collected farther upstream near Akasha) at 20 m above present flood-level.

Sedimentation built up another 15 or 20 m above the *Corbicula* horizon during the next few hundred years, with a final peak-level about 10,000 years B.P. This must have been about the end of the last ice age desiccation of central Africa, because subsequent history of the middle Nile is one of almost constant cutting down of the river bed. Oscillations of the flow produced a series of terraces, sometimes marked by shell horizons.

One should note that while the maximum sedimentation-levels represent minimum fluvial discharge, in the subsequent dissection and terracing, the terrace deposits may, in contrast, represent abandoned flood-level deposits. A temporary low level (12 m above high Nile, south-east of Wadi Halfa) was marked by the little gastropods *Cleopatra bulimoides* (*I*–534), which dated 9,325 ± 250 years B.P. They were buried by a rising Nile which reached 20 m again. Another negative oscillation, to 13 m above high Nile, was marked by charcoal from a camp-fire site at Ukma (*I*–530), dated 7,300 ± 350 years B.P.

The climatic picture at this time (11,000–7,000 B.P.) in Egypt suggests a considerable incidence of rainfall[9], almost certainly in part summer monsoonal rains, for a rich and varied fauna migrated northwards and are faithfully recorded by artists of the Mesolithic and Neolithic cultures.

At this stage some other radiocarbon dates take up the record (see Fig. 1). Collected by Myers[10,11] from the region of Abka, 20 km south Wadi Halfa in an abandoned section of the Second Cataract, they show how the present level of the Nile was reached about 5,000 B.P.

The Dynastic Period and subsequent times, with man's predilection for building temples, further helps to fill in the story[12–14]. This is not the place for an analysis, but a preliminary study of the records suggests that there have been extended periods of relatively high and low Nile floods. Archæologically dated 'high water marks' on Egyptian temples and associated Christian constructions near Wadi Halfa suggest that the last important high Nile periods were about A.D. 500 and 800.

Conclusions

Comparison of this tentative curve for Nile oscillations with the eustatic curve (of world sea-level variations), suggests that the 'minor oscillations' are in phase, thus implying a common cause, though, of course, with differing amplitudes. We feel that this common factor can only be solar radiation.

Much more work is needed, but it is suspected that the tropical lake beds of Africa will also prove to be in phase with solar radiation, while the temperate lake-levels will be out of phase. Further support is offered to the concept of long-term climatic cyclicity, with its potential for prediction.

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OBITUARIES

Dr. E. W. R. Steacie, O.B.E., F.R.S.

Dr. E. W. R. Steacie, president of the National Research Council (Canada), died on August 28 in Ottawa after a brief illness at the age of sixty-one.

Dr. Steacie had been president of the National Research Council since 1952. He joined the Council in 1939, following a teaching and research career at McGill University. Well known as a physical chemist, he was at the time of his death serving in the three-year presidency of the International Council of Scientific Unions, the chief non-governmental organization for co-ordinating international activity in science.

Edgar William Richard Steacie was born on December 25, 1900, in Westmount, Quebec. He won the Gold Medal of the Westmount High School and the Westmount School Commissioners Scholarship. Enrolling at McGill University, he left to become a corporal in the Canadian Infantry during the First World War. He returned to McGill in 1920, and graduated in 1923 with the degree of B.Sc., with first-class honours in chemical engineering. During this period he won the British Association Medal for highest standing in the undergraduate course and a scholarship of the Imperial Order of the Daughters of the Empire. He obtained his M.Sc. in 1924 and his Ph.D. in 1926, both in physical chemistry from McGill. His postgraduate studies were aided by a National Research Council scholarship.

In 1923 he was appointed McGill demonstrator in chemistry in McGill University. During 1926–28 he occupied the Sterry Hunt fellowship in chemistry, becoming lecturer in chemistry in 1928 and assistant professor of chemistry in 1930. He was on leave of absence from McGill in 1934–35, when he did post-doctorate research at Frankfurt, Leipzig, and the University of London on a fellowship from the Royal Society of Canada. In 1937 he was appointed associate professor of chemistry at McGill.

Dr. Steacie joined the National Research Council in 1939 as director of the Division of Chemistry. He became vice-president (scientific) in 1950 and, in April 1952, was elected president of the Council.

During the Second World War, Dr. Steacie played a large part in organizing Canadian chemistry for war purposes, especially in the fields of chemical warfare and the development of explosives. During 1944–46 he was deputy director, under Sir John Cockcroft, of the British–Canadian Atomic Energy Project in Montreal.

For his services during the War, he was appointed an Officer of the Order of the British Empire. He was a Fellow of the Royal Society of Canada and of the Royal Society of London. He was a Foreign Associate

of the U.S. National Academy of Sciences of the United States, a Foreign Member of the Academy of Sciences of the U.S.S.R., an Honorary Member of the Polish Chemical Society and the Belgian Chemical Society, and an Honorary Fellow of the Chemical Society of London.

Among other honours, Dr. Steacie was awarded the Gold Medal of the Professional Institute of the Public Service of Canada (1949), the Palladium Medal of the Chemical Institute of Canada (1953), the Tory Medal of the Royal Society of Canada (1955), and eighteen honorary degrees.

One of Dr. Steacie's principal interests was the development of Canada's universities. He was at the time of his death serving as chairman of the Board of Governors of Carleton University, and chairman of the Advisory Committee for Science of the University of Ottawa.

Dr. Steacie's scientific work was in the fields of photochemistry, the kinetics of gas reactions, and free radical reactions, important as the basis of petroleum technology. The work consisted of fundamental research, without immediate application, but making outstanding contributions to basic knowledge. He had published more than two hundred scientific papers, and was the author of three books. One of his books, *Atomic and Free Radical Reactions*, is regarded as the standard text on that subject.

Besides serving as president of the National Research Council, Dr. Steacie was a member of the Defence Research Board and the Atomic Energy Control Board, and a director of Canadian Patents and Development Limited and the Canadian Standards Association.

Dr. J. W. T. Walsh, O.B.E.

By the death of Dr. J. W. T. Walsh on July 17, at the age of seventy, the world has lost one of its leading figures in the field of lighting and photometry. Dr. Walsh was a man of very wide interests and had long been held, both nationally and internationally, in the highest regard and esteem.

Educated at Hampton Grammar School and Merton College, Oxford, he went to the National Physical Laboratory to work under Sir Clifford Paterson (then Mr. C. C. Paterson), and when the latter left the Laboratory in 1919, Dr. Walsh remained to take charge of the work on photometry, until his retirement in 1951. During this period, he was able to exercise, through his position at the Laboratory, a considerable influence on the advances made in photometry, particularly those concerned with the change from visual to physical methods of measurement and with the adoption internationally of a black body radiator as the primary standard of light in place of sets of filament lamps.

His versatile gifts were used to the full on many other aspects of his subject. He served on numerous committees, a specially important one being the Home Office Committee which drew up the first regulations for standards of lighting in factories. He became a founder member of the British Standards Institution Illumination Industry Standards Committee in 1927 and served as its chairman during 1945–55; the subjects in which he was particularly interested were street lighting and nomenclature. He also wrote a number of books, notably his textbook on *Photometry*, the latest of three editions having been published in 1958. In addition, he was the author of numerous papers.

In 1929 he was elected to membership of the Institution of Electrical Engineers, after being an associate member from 1918, and was awarded the Kelvin and Ayrton premiums.

For many years he played a very active part in the Illuminating Engineering Society and he achieved the unique distinction of being elected its president on two separate occasions, in 1929 and 1947.

Dr. Walsh's interest in illumination extended also to the work of the National Illumination Committee, to which he was appointed as the representative of the National Physical Laboratory as far back as 1919. He served as chairman during 1945–55. This work brought him into close touch with the parent International Commission on Illumination, the general secretary of which was provided by the National Physical Laboratory for the period between the ends of the two World Wars. Dr. Walsh himself was the first to hold office in this period (during 1921–28) and was honorary secretary during 1928–31. He attended every meeting of the Commission up to the most recent one in 1959. Throughout this time he steadily built up a reputation as one of the Commission's leading figures and in 1948 was appointed one of its vice-presidents. Later, in 1955, full recognition was given to him by his appointment as president and he duly presided over the next meeting at Brussels in 1959. It is understood that he had recently completed a history of the Commission, and the publication of this will be awaited with much interest.

Recognition of his work was acknowledged in 1951 by his appointment as an Officer of the Order of the British Empire.

During his early time at the National Physical Laboratory Dr. Walsh took a considerable interest in its social activities, but later much of his private life was devoted to youth work, both on behalf of organizations such as the Boy Scouts and in numerous individual cases. He was also interested in education and served on a number of local bodies. He gave a start in life to very many less fortunate than himself.

Although a bachelor with few family connexions, he was by his wide and humane interests a man with innumerable friends in many countries and his passing will be universally mourned.

J. S. Preston
L. H. McDermott

Prof. S. Mangham

Sydney Mangham, who died on July 30 at the age of 76, was the first professor of botany in what was then the University College of Southampton. Sutherland, and before him Cavers, had been professors of biology; but in 1920 the department was divided. Sherriffs was made head of the department of zoology, and Mangham was appointed to the new chair of botany. For the first seven years of his professorship Mangham's staff consisted of one lecturer, Miss F. M. Loader (who remained with him during the whole of his tenure), a temporary and ever-changing student assistant, and a lab-boy; and Mangham taught virtually all branches of botany at all levels, including a course for gardeners. Had he been a man of strong research interests, the task would have been intolerable; but his early interests in analytical techniques and in translocation rapidly succumbed to his genuine love of teaching. Dissatisfied with existing introductory text-books he wrote *A First Biology* and *A Second Biology* with