Neither Magoon nor Armstrong mentioned the principle of rhythmic exposure to an unfavorable environment as a possible factor of broad application in the study of the mechanism of species adaptation, although their technique involved this principle.

Huntington[6] is the only investigator of whom we are aware who has presented data and observations emphasizing the importance of an alternating environment. Huntington's thesis is that the highest human civilizations have arisen only in areas where there was an alternating climate. Continuously hot or continuously cold climates are enervating. A changeable climate is stimulating. A thorough search of the biological literature may reveal other examples that, in the light of our experiments, may now suggest the general biological importance of rhythmic exposure to unfavorable environments.

SUMMARY

(1) Three widely separated species have been exposed *continuously* to carcinogenic and other agents over a considerable period of time and throughout many cell-division cycles.

(2) Evidence is presented to show that each of these species may be weakened and in some cases destroyed when exposed to amounts of these unfavorable agents which have no measurable deleterious effect on individual organisms, but which may in some cases at first be stimulating. The biological generalization that certain environments may be ontogenetically harmless but phylogenetically lethal is suggested.

(3) Preliminary tests suggest also that a *rhythmic* rather than a *continuous* exposure of a species to harsh environments may be a very useful technic to employ in the study of the mechanism of species adaptation.

OBITUARY

SIR WILLIAM BRAGG

ON Thursday, March 12, in the passing of Sir William Bragg, death robbed physics of one of its most illustrious ornaments and all science of one of its best loved friends.

In an age when so much of discovery falls to the lot of youth, it is a comfort to ponder the cases in history which stand as proof that middle age does not always spell the death of originality and that maturity provides its own special seasoning in the realms of discovery, a seasoning which science would miss greatly were it deprived of it. Sir William Bragg stands as an example of rich development in years in which the prime of youth has passed; for though, naturally, he was a successful student and an eminently successful teacher, it was not until eighteen years after his departure from Cambridge to accept the professorship of mathematics and physics at the University of Adelaide that he published his first paper when he was more than 40 years old. It is very evident, however, that in the years which had preceded, there had been a great strengthening of mental forces to the point of readiness for service when once released in the search for new truth, for within three years of his first publication he had become a fellow of the Royal Society, and from that time onwards he was a continual contributor to the journals of science.

Bragg's first paper on the range and ionization of alpha particles is one of the fundamental stepping-stones in the science of radioactivity, and he continued to contribute richly to that field, partly in collaboration with Kleeman. In 1908 he returned to England as professor of physics at the University of Leeds, and it was not long before he became interested in x-ray research, coming into that field at a time when, with the principles of the quantum theory knocking at the doors of science, conventional electromagnetic views as to the behavior of nature held powerful sway in the halls of learning. Bragg was a strong advocate of the particle nature of x-rays and, while none can doubt the broadness of his concepts of the nature of what was then termed a particle, his natural desire for simplicity of expression caused his writings to take a form which invited considerable controversy with the extreme opposed school, represented prominently at the time by C. G. Barkla, who desired to retain classical electrodynamics in as pure a form as possible. It is characteristic of Bragg's broadness of view and his adaptability to changing pictures that, following von Laue's fundamental discovery in x-ray diffraction, he entered that field with enthusiasm and, in collaboration with his son, William Lawrence Bragg, became the most prominent worker in the field which established the science of x-ray spectroscopy. He was at Leeds when the war of 1914–18 broke out, but he became professor of physics at University College, London, in 1915. Most of his time during the war was devoted to government work and he became director of the Royal Institution and the Davy-Faraday Research Laboratory in 1923. In this position his powers reached their maximum field of usefulness. Endowed with all the personal charm so essential to the office, he was a worthy successor to Faraday, not only as a fruitful investigator, but also as an inspiring speaker possessed of a gift for lucidity which made his lectures a joy, both to the man of science and to the layman.

[6] Ellsworth Huntington, "Civilization and Climate." Yale University Press, 1922.

Bragg was keenly interested in the history of the Royal Institution and in the work of his great predecessor, Michael Faraday. He played a very prominent part in the publication of Faraday's diary and was responsible for bringing about a very delightful occasion when at the institution—the centenary of Faraday's discoveries, which was celebrated in 1931.

Sir William Bragg was born on July 2, 1862, at Wigton, Cumberland, England. In Adelaide he married Gwendoline, daughter of Sir Charles Todd, and had three children, Sir Lawrence Bragg, now at the University of Cambridge, Gwendy, now Mrs. Alban Caroe, and Robert. He was the recipient of many honors, among them the Order of Merit, the Nobel Prize for physics, the Rumford and Copley Medals, the Barnard Medal of Columbia University, and the Franklin Gold Medal of the Franklin Institute. He served as president of the British Association for the Advancement of Science and from 1935–40 was president of the Royal Society of London.

Sir William was noted for his kindly disposition and his courtesy to all. He had a simplicity of manner which endeared him both to his intimate colleagues and to those whom he met casually. Death has dealt heavily with physics during recent years. First Lord Rutherford, then his old professor, Sir J. J. Thomson, next the oldest of them all, Sir Oliver Lodge, and, finally, Sir William Bragg have been gathered to the halls of the illustrious dead. It is a grand and noble company which thus carries to Valhalla the records of achievement of the most fruitful epoch in the whole history of science.

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DEATHS AND MEMORIALS

DR. WILLIAM LOGAN BENITZ, since 1896 professor of mechanical engineering at the University of Notre Dame until his retirement with the title emeritus in 1939, died on June 1. He was sixty-nine years old.

DR. JOSEPH HYDE PRATT, consulting engineer and geologist, from 1904 to 1926 professor of economic geology at the University of North Carolina and from 1905 to 1924 state geologist, died on June 2, at the age of seventy-two years.

DR. DONALD FRANCIS MACDONALD, consulting geologist for the Panama Canal Zone, formerly professor of geology at St. Francis Xavier University, Nova Scotia, died on May 29 in his sixty-seventh year.

DR. MILLARD MANNING, assistant professor of physics at the University of Pittsburgh, died on June 1, at the age of thirty-six years.

THE REV. DR. THEODORE EVELYN REECE PHILLIPS, rector of Headley, Epsom, from 1916 to 1941, a past president of the Royal Astronomical Society and the British Astronomical Association, died on May 13, at the age of seventy-four years.

DR. G. G. STONEY, consulting engineer, from 1917 to 1926 professor of mechanical engineering in the College of Technology and in the Victoria University, Manchester, from 1926 to 1930 director of research at C. A. Parsons and Company, died on May 15 in his seventy-ninth year.

TAU CHAPTER of Nu Sigma Nu at Cornell University Medical College has voted to name its annual lectureship for Walter L. Niles, dean of the college for many years and at the time of his death in December, 1941, acting dean. A fellowship in the department of medicine at Cornell also has been established in Dr. Niles's memory.

SCIENTIFIC EVENTS

DRUG CONTROL IN INDIA

Nature gives an account of progress in the problem of drug standardization and control in India.

In January, 1937, the nucleus of a central laboratory, the Biochemical Standardization Laboratory, was established, under the direction of Sir R. N. Chopra, in Calcutta, at the All-India Institute of Hygiene and Public Health. The laboratory has now made satisfactory progress in the limited number of studies undertaken and has trained adequate personnel and laid sure foundations for future work in this field as evidenced in the triennial report of the laboratory. During the three years preceding the introduction of the Drugs Bill in February, 1940, it was thought that the best course for the laboratory was to undertake a general survey of the quality of medical drugs in the Indian market and an examination of the specimens of drugs both imported and manufactured in India which were suspected to be of inferior quality.

Many drug manufacturing firms in India do not maintain properly equipped pharmacological laboratories with trained personnel capable of undertaking the standardization of chemotherapeutic preparations, and it was natural that ethical manufacturing concerns interested in the quality of their products should approach the only government organization available with requests to have their products standardized.

In the initial stages the laboratory had necessarily to restrict itself to certain definite drugs of com-