



THE SUMMER AT CALTECH

Edwin P. Hubble 1889-1953

DR. EDWIN P. HUBBLE, 63, one of the world's leading astronomers, died of a stroke at his home in San Marino on September 28. His wife, the former Grace Burke, whom he married in 1924, survives.

Dr. Hubble joined the Mount Wilson Observatory in 1919 and at the time of his death was a staff member of the Mount Wilson and Palomar Observatories. He was recognized as a foremost authority on spiral nebulae and was noted for his determination of the nature and distance of these stellar systems beyond our Milky Way and for developing the law of red-shifts. That law has been taken to indicate that outlying stellar systems are receding at speeds increasing with their distance from the observer. It has generally been interpreted as meaning that the universe is expanding.

"Dr. Hubble's . . . observations with the 100-inch telescope during his first ten years at the Observatory completely revolutionized our ideas as to the extent of the universe," says Dr. Ira S. Bowen, Director of the Mount Wilson and Palomar Observatories.

"Before 1920 the universe was thought to consist of one great stellar system, the Milky Way. Hubble's studies, however, showed that our Milky Way system is but one of some hundreds of millions of such stellar systems which extend out to the extreme limit of observation of our largest telescopes.

"These discoveries emphasized the need of even

greater telescopes and provided one of the chief reasons for the construction of the 200-inch telescope. Hubble assisted greatly in the design of this larger instrument and carried out the first observations with it. He has served on the Observatory Committee since the start of the joint operation of the Mt. Wilson and Palomar Observatories. His sound and effective advice concerning the operation of the Observatories will be greatly missed."

Born on November 20, 1889, in Marshfield, Missouri, Hubble was awarded the bachelor of science degree in 1910 at the University of Chicago, where he became interested in astronomy. He then studied law at Oxford University in England for two years as a Rhodes Scholar, receiving the degree of bachelor of arts in jurisprudence, and spent another year there as Rhodes Memorial Lecturer.

He was admitted to the bar in Louisville, Kentucky, in 1913 and practiced law for a year. However, his interest in astronomy was too strong to resist and he returned to the University of Chicago, where he received his Ph.D. in astronomy in 1917.

By then, however, he was already serving in the U. S. Army, where he completed his Ph.D. thesis as time permitted. He had enlisted in the first Officer Training Corps and during World War I rose from line officer to Major of Infantry with the A.E.F. in France.

After the war he joined the Mount Wilson Observatory, where he remained except for his service, from 1942 to 1945, as Chief of the Exterior Ballistics Branch of the Army Ordnance Ballistic Research Laboratory at Aberdeen Proving Ground, Maryland. He was awarded the Medal for Merit for his outstanding contributions to the war effort in 1946. In that year he also became consultant to the Ballistic Research Laboratory.

Dr. Hubble was active in the community as a trustee for the Huntington Library and as a member and past chairman of the Los Angeles Committee on Foreign Relations. He was an ardent dry fly fisherman and collector of original works important in the history of science.

He was the author of two books—"The Realm of the Nebulae," published in 1936, and "The Observational Approach to Cosmology," published in 1937—as well as numerous scientific papers.

His scientific contributions were recognized by many American and foreign universities and professional societies. He received honorary degrees from Oxford, Princeton and Brussels Universities, Occidental College and the University of California. His gold medals included the Barnard Medal, Bruce Medal, Franklin Medal and the Medal of the Royal Astronomical Society.

Said President DuBridge: "In the passing of Edwin Hubble the world has lost one of its greatest astronomers; and Pasadena has lost one of its greatest citizens. He will be missed by scientists the world over—most of all by his colleagues at Caltech, at the Mount Wilson and Palomar Observatories and the Huntington Library. To them he was not only a great scientist but also an irreplaceable friend."



Sir Lawrence Bragg, Visiting Professor of Chemistry

Sir Lawrence Bragg

SIR LAWRENCE BRAGG, Nobel Laureate and co-founder of X-ray crystallography, and a dozen other British scientists participated in an informal conference on the structure of proteins at the Institute last month with leading American scientists in the field.

The conference of the select group of invited participants ran from September 21-25. It was made possible through support from the Rockefeller Foundation, the National Foundation for Infantile Paralysis, and the Office of Naval Research through the American Institute of Biological Sciences.

The conferees discussed informally all aspects of the application of X-ray techniques to the problem of protein structures. No formal papers were presented.

Arrangements for the meeting were made by Drs. Linus Pauling, Robert B. Corey and Edward W. Hughes of the Caltech Division of Chemistry and Chemical Engineering, one of the world centers of protein structure research. They and several of their colleagues have been engaged for some 15 years in intensive efforts to learn the molecular configuration of various proteins, essential constituents of all living things. The research has resulted in the past two years in proposed structures for a number of proteins, among them those found in muscle, hair and fingernails.

They have primarily been using modified methods of X-ray crystallography, a technique originally developed about 40 years ago by Sir Lawrence Bragg and his late father, Sir William Bragg, as a means of determining the position of atoms in crystals by the use of X-rays.

Sir Lawrence, Cavendish Professor of Experimental Physics at Cambridge University since 1938, recently was appointed Fullerian Professor at the British Royal Institution and will take up these duties January 1. He is accompanied on his visit to Pasadena by Lady Bragg.

After the conference, Sir Lawrence stayed on at Caltech as Visiting Professor of Chemistry to give a series of scientific lectures during the first two weeks of the first term.

A native of Adelaide, South Australia, he entered the University of Adelaide at the age of 15. Seven years later, in 1912, he was graduated from Cambridge University with first class honors in physics and began analyzing the patterns which Max von Laue of Germany reported were produced when X-rays struck crystalline materials. This work and parallel research by his father led to their development of a technique by which X-rays are used to determine the geometrical structure of crystals and to their election to share the 1915 Nobel Prize in physics when the younger Bragg was 25 years old.

By 1919 he was a full professor at the University of Manchester and two years later, at the age of 31, was elected to the Royal Society. He became director of the Cavendish Laboratory at Cambridge University

in 1938 and in 1941 was knighted in recognition for his scientific achievements. He has been awarded the Hughes and Royal medals of the Royal Society and the Roebling Medal of the Mineralogical Society of America in addition to receiving honorary degrees from ten leading universities.

William N. Birchby 1877-1953

WILLIAM N. BIRCHBY, 76, who retired in 1952 as Assistant Professor of Mathematics after 34 years on the Caltech faculty, died on September 13 at his Altadena home. Survivors include his wife, Marjorie, and daughter, Mary Clare Birchby.

Born near Manchester, England, he came to the United States as a small boy. He was awarded the A.B. degree at Hope College, Holland, Michigan, in 1899, and the M.A. at Colorado College in 1905.

Before coming to Caltech in 1918 he was an instructor at Colorado College and a summer instructor at the University of Southern California. At Caltech he served as assistant registrar and on the committees on freshman registration and admission to upper classes.

Professor Birchby was an expert designer of mathematics examinations, and his programs for testing the knowledge of students were famous throughout the Institute. He has done research and written a number of papers in his field of mathematical analysis. At Colorado College he collaborated in work on the theory of equations.

Faculty Changes

ADDITIONS to the Caltech faculty for the academic year 1953-54 include:

John D. Roberts, *Professor of Organic Chemistry (E&S—March, 1953)*.

Lester Lees, *Associate Professor of Aeronautics and Applied Mechanics (E&S—June, 1953)*.

James C. Davies, *Assistant Professor of Political Science*. Dr. Davies received his Ph.D. from the University of California at Berkeley in 1952, and has spent the last two years at the Survey Research Center at the University of Michigan, on a Carnegie Corporation fellowship. A specialist in public opinion research, he will teach a course in Political Behavior at Caltech as well as one in American History and Government.

Thomas M. Smith, *Assistant Professor of the History of Science*. Dr. Smith comes from the History of Science Department at the University of Wisconsin, where he has been completing his work for the Ph.D. He is a 1946 graduate of U.C.L.A.

L. G. Berry, *Visiting Professor of Chemistry*. Dr. Berry has a fellowship from the John Simon Guggen-

heim Memorial Foundation. He comes from Queen's University, Kingston, Ontario, Canada, where he is an Associate Professor.

Sir Lawrence Bragg, *Visiting Professor of Chemistry*. Sir Lawrence will be at Caltech only for one month, at the beginning of the first term (see p. 27).

Richard L. Greene, *Visiting Professor of English*. Dr. Greene is former President of Wells College in Aurora, New York.

George E. Hall, *Visiting Professor of Chemistry*. Dr. Hall holds a faculty fellowship from the Fund for the Advancement of Education. He is from Mt. Holyoke College in Massachusetts where he is an Associate Professor of Chemistry.

Terminations:

Albert G. Wilson, *Staff Member of the Mount Wilson and Palomar Observatories, now Associate Director of the Lowell Observatory in Flagstaff, Arizona*.

Howard J. Teas, *Senior Research Fellow in Biology, now at the Federal Experiment Station of the U. S. Department of Agriculture in Mayaguez, Puerto Rico, working on the biochemistry of rubber formation*.

John A. Schutz, *Assistant Professor of History, now a lecturer in history and political science at Whittier College, Whittier, Calif.*

Wilbur A. Varney, *Assistant Professor of Mechanical Engineering*.

On Leave of Absence, 1953-54:

Henry A. Dye, *Instructor in Mathematics, to do research at the Institute for Advanced Study, Princeton, New Jersey*.

Heinz Ellersieck, *Instructor in History, to study in Scandinavia and Germany, on a fellowship from the Fund for the Advancement of Education*.

Howard J. Lucas, *Professor of Organic Chemistry, to be Visiting Professor of Organic Chemistry at the University of Hawaii for the first semester*.

Henry Dan Piper, *Assistant Professor of English, to teach American Literature at the University of Lille, France*.

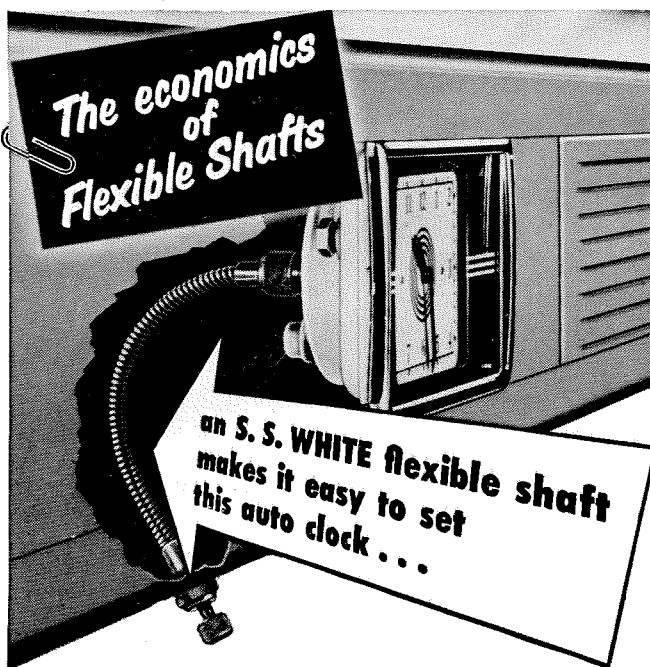
Harold Wayland, *Associate Professor of Applied Mechanics, to study at the University of Strasbourg, France, on a Guggenheim Fellowship*.

Returned from Leave of Absence:

J. B. Koepfli, *Research Associate in Chemistry, after serving for two and a half years as Science Advisor to the Secretary of State*.

Thomas Lauritsen, *Associate Professor of Physics, from a year's study, on a Fulbright Award, at the Copenhagen Institute for Theoretical Physics*.

Matthew Sands, *Associate Professor of Physics, after*



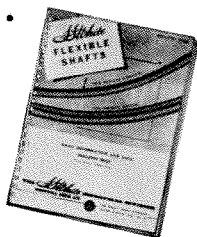
When this automobile clock was designed, its manufacturer had in mind the probability of varied instrument panel locations with the resultant need of an adaptable coupling to the control knob. He chose an S.S.White flexible shaft to do the job. As the illustration shows, this simple hook-up permits both the clock and the control knob to be located in its most advantageous position.

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THE SUMMER . . . CONTINUED

ten months as a Research Scholar under the Fulbright program at the Institute of Physics of the University of Rome.

George K. Tanham, Assistant Professor of History, after a year's reading at Oxford, on a fellowship from the Fund for the Advancement of Education.

Pure Chemistry Award

DR. JOHN D. ROBERTS, Professor of Organic Chemistry, has been named recipient of the 1954 American Chemical Society Award in pure chemistry. The \$1,000 award, given annually to an outstanding young chemist in recognition of his contributions in fundamental research, will be presented at the spring meeting of the society in Kansas City.

Professor Roberts is the third member of the Caltech faculty to win the award in the past five years. Dr. Verner F. H. Schomaker, Professor of Chemistry, received it in 1950 and Dr. Harrison S. Brown, Professor of Geochemistry, in 1952. Professor Linus Pauling, Chairman of the Division of Chemistry and Chemical Engineering, received the first award in 1931.

Professor Roberts has conducted research in the field of physical organic chemistry since 1940. His chief investigations have dealt with theoretical organic chemistry, and he has conducted radioactive tracer research and studies on small-ring organic compounds and rearrangement reactions of organic compounds.

Dr. Roberts, who joined the Caltech faculty on July 1, was a John Simon Guggenheim Memorial Fellow last year, carrying on research at Caltech and in Europe on the theory of the structure of organic compounds.

Lilly Award

DR. HARVEY A. ITANO, Senior Research Fellow in Chemistry, was named recipient of the 1954 Eli Lilly and Company Award in biological chemistry at the annual meeting of the American Chemical Society in Chicago last month.

The \$1,000 award is made in recognition of contributions to fundamental research in biological chemistry and is presented annually to an outstanding young American chemist.

Dr. Itano, who is a senior assistant surgeon of the National Cancer Institute of the National Institutes of Health, is assigned to the Gates and Crellin Laboratories of Chemistry at Caltech by the U. S. Public Health Service. He is engaged in research on the physical chemistry and inheritance of abnormal human hemoglobins, and has pursued studies on the problems and diagnosis of sickle cell anemia.

A graduate of the University of California, Dr. Itano received the M.D. degree from St. Louis University in 1945 and the Ph.D. degree from Caltech in 1950.