

THE MONTH AT CALTECH

Church Laboratory

A BEQUEST OF THE late Norman W. Church of Los Angeles to the California Institute of Technology, together with gifts he made to the Institute a few months before his death on January 7, will make possible construction of a \$1,500,000 chemical biology laboratory on the campus.

The Norman W. Church Laboratory of Chemical Biology will be located in the northwest corner of the campus, at the intersection of San Pasqual Street and Wilson Avenue. It will be joined to the present Crellin Laboratory of Chemistry, and also, eventually, to the Kerckhoff Laboratories of the Biological Sciences.

"The building," Dr. DuBridge explains, "will house important research work in the area where chemistry and biology come together, work which has developed rapidly at the Institute during the past few years under the joint leadership of Professors Linus Pauling, Chairman of the Division of Chemistry and Chemical Engineering, and George Beadle, Chairman of the Division of Biology.

"Completion of this laboratory will fulfill hopes and plans which were initiated more than five years ago. At that time the combined chemistry and biology program of the California Institute was visualized and initiated. The program was given assurance of support through a grant from the Rockefeller Foundation of \$700,000, available for use over a seven-year period. At the time this new program was announced, Mr. Church expressed a keen interest in it and informed Institute officials of his hope that he could help to provide a building to house the work."

These plans materialized last summer when Mr. Church gave \$750,000 to the Institute to provide for the initial phase of construction. He asked that no announcement of his gift be made until the beginning of construction, now scheduled for the spring of 1953.

At Mr. Church's request, Stiles and Robert Clements of Los Angeles were asked to serve as architects for the proposed building. They have been collaborating with Caltech staff members in drawing up plans during recent months.

Preliminary plans for the Church Laboratory call for a structure three stories high above ground, plus two

floors below ground. The laboratory will have an overall length of 305 feet along San Pasqual Street and a width of 52 feet. It will join the Crellin Laboratory at the east end, and, if funds permit, a connecting wing will be built to the Kerckhoff Laboratories to the south.

In making his \$750,000 gift last summer, Mr. Church had promised that he would provide additional funds at a later date for the laboratory. His will has now been filed for probate and provides a specific bequest of \$300,000 to complete the building. The will also provides that after other specific bequests, the residue of Mr. Church's fortune be used by Caltech to establish the Norman W. Church Fund for research in chemical biology.

Conservation Award

DR. JOHN P. BUWALDA, Professor of Geology, last month received an Honor Award from the California Conservation Council for his effective work for the conservation of natural resources.

Dr. Buwalda has worked continuously for the past 25 years with the National Park Service for the better use of national parks. A member of the board of expert advisers to the National Park Service, he later served on the Yosemite Advisory Committee. Dr. Buwalda has also been active in water supply conservation in connection with work on the Colorado River Aqueduct and construction of dams in California. During the last war he worked to increase water supplies for army camps and military hospitals, and his World War I activities were directed toward increasing the strategic mineral supply.

Professor Buwalda was Chairman of the Division of Geological Sciences at Caltech from 1925-47. For the past two years he has been president of the Seismological Society of America.

Bowie Medal

DR. BENO GUTENBERG, Professor of Geophysics and Director of the Seismological Laboratory, has been selected as the 1953 recipient of the William Bowie

CONTINUED ON PAGE 28

THE MONTH . . . CONTINUED

Medal presented by the American Geophysical Union.

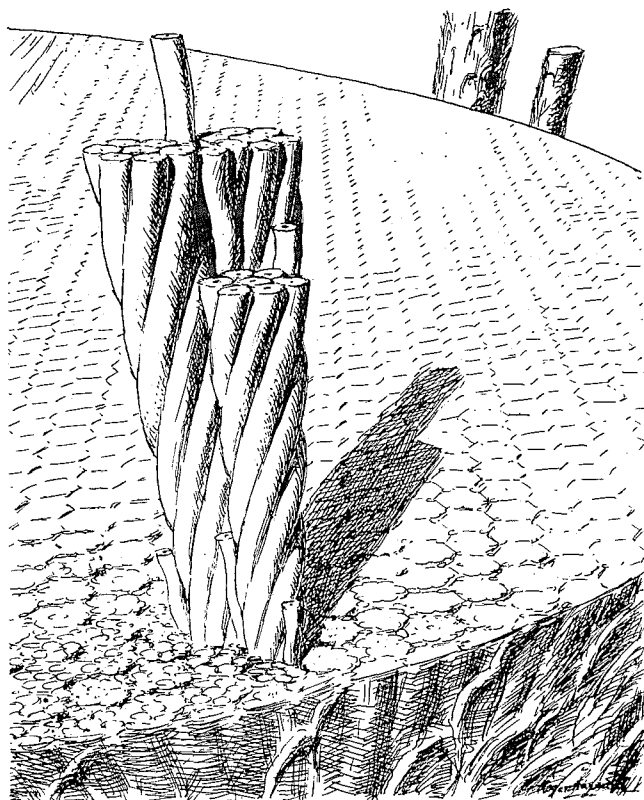
He will be given the award at the organization's annual meeting, to be held May 4-6 in Washington, D. C. Walter D. Lambert, award committee chairman, informed Dr. Gutenberg of his selection by unanimous vote. The medal is given annually "for distinguished attainment and outstanding contribution to the advancement of cooperative research in fundamental geophysics."

Barrett Scholarship

ANNOUNCEMENT OF THE Edward C. Barrett Memorial Scholarship Fund was made this month, in a letter sent to Mr. Barrett's friends on the Caltech staff, among the alumni, and in the community.

"In the death of Edward C. Barrett last spring," the letter reads, "the California Institute lost a devoted servant who had been intimately involved in every phase of the Institute's growth and development since 1910, when it began operations in Throop Hall on the the present campus with only thirty-five students. Mr. Barrett's friends on the staff, among the alumni, and in the community feel very strongly that some permanent memorial should be established in recognition of this service.

"Since he always had, throughout his years at Caltech, a particularly warm and sympathetic interest in the welfare of the students, it seems that the most ap-



Artist's conception of the molecular structure of hair, suggested by studies of Drs. Pauling and Corey.

propriate memorial to him would be an undergraduate scholarship awarded annually in an amount to cover tuition.

"A substantial sum has already been made available as the nucleus of the Edward C. Barrett Memorial Scholarship Fund, and it is hoped that additional contributions will make possible the maintenance of this scholarship on a permanent basis. Checks should be made payable to the Barrett Scholarship Fund, California Institute of Technology, and sent to Mr. H. H. G. Nash, Secretary, Room 108A Throop Hall, California Institute, Pasadena. We will be happy to answer any questions which you may care to direct to us."

Donald S. Clark
Margaret Fleming
William A. Fowler
Ray Gerhart
Abe J. Hay

Wesley Hertenstein
William Huse
George R. MacMinn
Robert A. Millikan
H. H. G. Nash

Protein Structure

LINUS PAULING, Chairman of the Division of Chemistry and Chemical Engineering at the Institute, and Robert B. Corey, Professor of Chemistry, have discovered evidence that muscle, hair, fingernail and other body proteins contain molecules twisted into the shape of ropes and cables.

In 1951, after 15 years' work on the problem, Drs. Pauling and Corey announced the discovery of the molecular structure of some proteins (E&S—October 1951). They found then that the *individual* molecules in muscle, hair, fingernail, and many other proteins consist of a series of atoms of carbon, hydrogen, nitrogen, oxygen and sometimes other elements which are coiled into spirals or helixes.

Now they have found that seven of these coiled molecules can be twisted into a cable, and they believe that these cables are present in hair and some other proteins. Each cable consists of a central molecule, coiled into a spiral, and six other molecules, also coiled into spirals, which are themselves coiled around the central molecule to form a seven-strand cable.

This coiling closely resembles that of a rope, in which the individual strands are coiled in one direction, and then the strands themselves are coiled around one another in the opposite direction. This prevents the rope from unraveling when it is stretched or when a piece is cut from it.

In their investigations—sponsored by the United States Public Health Service, the Office of Naval Research, and the Rockefeller Foundation—Pauling and Corey have found evidence that hair and similar proteins contain three different kinds of protein molecules (keratin A, B, and C). These are: (A) the coiled molecule forming the center of the cable, (B) the six coiled molecules twisted about this central one, and (C) two additional molecules filling in the spaces between the cables.

CONTINUED ON PAGE 30

The researchers believe it should be possible to separate the different kinds of molecules from one another chemically.

The principal protein of muscle—actomyosin—was separated into two distinct proteins—myosin and actin—a decade ago by Dr. Albert Szent-Gyorgyi, Hungarian Nobel Laureate, who is now associated with the Marine Biological Laboratory at Woods Hole, Massachusetts.

Professors Pauling and Corey suggest that in muscle the molecules of myosin are seven-strand cables and that the molecules of actin are coils filling up the spaces between the cables in actomyosin. They predict that it should be possible to separate myosin further into two distinct proteins: the one found in the central coil and the one consisting of the molecules twisted around it.

This new knowledge about the structure of proteins has been obtained by the study of X-ray diffraction patterns of the amino acids which make up proteins, and also of the X-ray patterns of the proteins themselves. In 1915, three years after Dr. Max von Laue of Germany discovered that X-rays were diffracted by crystals, Caltech scientists set out to determine the structure of some crystals by using X-rays. The technique has continued since then to be one of the more important fields of research in the Caltech chemistry division.

The Caltech investigators now believe that the X-ray diffraction method should provide significant information about the structure of abnormal proteins involved in disease and that it may soon become a powerful tool in fundamental medical research.

Turkey and China

TWO MORE REPRESENTATIVES of the American Universities Field Staff will visit the Institute this month. Last month Richard H. Nolte and Lawrence W. Witt of the AUFSS reported, respectively, on the Middle East and Brazil to the Caltech faculty, students and friends. On February 9 Richard H. Robinson arrives to report on Turkey, and on February 26 A. Doak Barnett will be here to discuss current conditions in China.

Mr. Robinson was born in Yakima, Washington, in 1921. He was graduated from the University of Washington in 1942 and received an M.B.A. degree from the Harvard Graduate School of Business Administration in 1943.

He enlisted in the Army in 1943, was shortly commissioned, and taught for a time in a Transportation Corps School. Later training in military government and Far Eastern studies led to his assignment at the end of the war to the Headquarters of the Military Government of South Korea, where he was placed in charge of the Office of Public Opinion and made responsible for assessment of Korean reactions to the American administration.

He left the Army in 1946 and became a civilian War

Department historian of Soviet-American relations in Korea. In July 1947 his employment by the Government ended and he and his wife travelled around the southern fringe of Asia to Turkey.

For the past five years Mr. Robinson has concentrated on Turkish affairs. He studied and taught for a few months at Robert College, Istanbul. Later, as an Associate of the Institute of Current World Affairs, he lived and studied provincial life in central Anatolia for nearly a year. More recently he and his family have lived in Ankara. Among the fields he has investigated are religious trends, political movements, labor organization, farm mechanization, and the effectiveness of American aid to Turkey.

Mr. Barnett was born in 1921 in Shanghai, China, the son of an American Y.M.C.A. official, and lived there until 1936. He was graduated from Yale *summa cum laude* in 1942. After wartime service as a Marine officer, he returned to Yale and took an M.A. in international relations.

He joined the Institute of Current World Affairs in 1947 and en route to China made brief visits in India, Singapore, Indonesia and Thailand. In China his program of field studies brought him into contact with such issues as the Nationalist elections and National Assembly meetings, rural and urban economic problems, labor organization in Shanghai, attitudes and activities of intellectuals, and the problems of racial minorities in border provinces.

During 1948-49 he observed the communist military siege and takeover of Peking and studied communist propaganda, policies, and actions on the spot. He then made further studies of conditions in Nationalist-controlled Yunnan and Kweichow provinces and on Hainan, Hong Kong and Formosa.

In 1950-51, back in the United States, Mr. Barnett was a consultant to the Far East Program Division, Economic Cooperation Administration. He then went to Hong Kong, and until June 1952 served there as Evaluation Officer (with rank of Consul) of the U. S. Information Service. He has now again taken up his private studies.

Chemistry Teaching

CALTECH IS ONE of 32 American colleges and universities which will benefit from a new program announced by the DuPont Company, to assist and advance the teaching of chemistry. The program goes into operation next fall. To 19 four-year private colleges DuPont has made grants to help the schools maintain their outstanding performance in the training of students majoring in chemistry. To 13 universities—including Caltech—the company has awarded postgraduate fellowships to improve the teaching of chemistry to undergraduates. The new plans broaden the company's present program of support for postgraduate study and fundamental research in universities, which will total \$600,000 for the academic year of 1953-54.

CONTINUED ON PAGE 32

THE MONTH . . . CONTINUED

The DuPont postgraduate teaching fellowships, which amount to a maximum of \$3500 for married fellows, are to be awarded to outstanding graduate students who have had two years' experience as half-time teaching assistants.

"Teaching is a field which merits industrial support," said Crawford H. Greenewalt, president of DuPont, in announcing the new program. "The maintenance and encouragement of high-quality teaching is vital to the future supply and quality of scientists and consequently research."

Cancer Research

THE INSTITUTE last month received a \$10,000 grant for cancer research from the Damon Runyon Memorial Fund. This was a renewal of a grant made last year.

Part of the grant, presented to Dr. George W. Beadle,

Chairman of the Division of Biology, will be used for studies of growth-regulating mechanisms and part for studies of some naturally occurring carcinogenic substances.

The studies of growth-regulation will be conducted on the bread mold *Neurospora* by Dr. Sterling Emerson, Professor of Genetics. These have been undertaken, Dr. Beadle says, because changes from normal to tumorous growth appear to result from alterations of body processes which regulate growth. The funds allocated to the Division of Biology will also help support the continued research of Dr. J. W. Dubnoff on enzymes and transmethylation processes.

In the Division of Chemistry and Chemical Engineering, Dr. L. Zechmeister, Professor of Organic Chemistry, and Dr. B. K. Koe have isolated some carcinogenic substances from barnacles. These substances are not inherent in the barnacles, according to the investigators, but enter them with small floating particles from the ocean. They may originate from either natural tars or artificial tar products.

SOME NOTES ON STUDENT LIFE

Out of Season

IN SPITE OF THE fact that it is now mid-season in basketball, football has held the interest of the conversationalists in the houses lately. The NCAA ruling, which effectively eliminates the two-platoon system that has been in effect since 1941, has been the subject of much debate. Though some have adopted the attitude of "I don't believe it," the general consensus seems to be "It can't be done." But Caltech men, invariably optimistic, are going to try; and the valiant attempt of footballers to change their styles is capturing the hearts of all Techmen.

The defensive specialist is gone forever, it seems, and defensive ends are forcing themselves to learn to catch passes. By the same token the offensive specialist is gone, too, and Tech quarterbacks are learning how to stop plays as well as start them. With football season over, it would seem a little strange, under normal circumstances, to see the gridiron giants practicing; so in order to allay any suspicion of 'snaking' football they have turned to more subtle ways of practicing.

Who would suspect that under the guise of a water fight with a rival house the grid star is practicing his football lessons? Who would believe that he is throwing that water-filled balloon for practice in passing alone? Who would be able to tell that his dashing through a hail of oranges is merely to develop a sure-footed running attack? Who would think that the fevered battles for the Ricketts brakedrum are merely

trial runs for a new and smashing gridiron defense? A great football team is obviously in the making!

Each Caltech man can thank his lucky stars that the Institute is placed in such a favored spot as southern California, where water is cheap and the oranges grow on trees (as, in fact, they do in most parts of the globe) so that such heated off-season football practice can exist.

Preliminary Event

AS A PRELIMINARY to the main event, the Freshmen elected a new set of officers last month. After much parliamentary haggling, amendments to the amendments, the reversal of precedence, and the bringing up of questions which even Robert's Rules of Order did not touch upon, a slate of candidates was picked.

Hurried conferences of political bigwigs pondered election strategy, and, in spite of their inexperience with this type of campaign (most of the candidates and their backers had come from schools where the fickle women's vote was all important) the political czars seemed pleased with the slate of candidates. Petty differences discounted, everybody seemed pleased with the new Freshmen officers, too.

It was truly heart-rending to hear many of the candidates decline nomination for offices, professing rare tropical maladies and mental inability. It was quite evident, however, that these maladies and inabilities would undoubtedly disappear come time for ASCIT elections the middle of this month. —Bill Barlow, '56