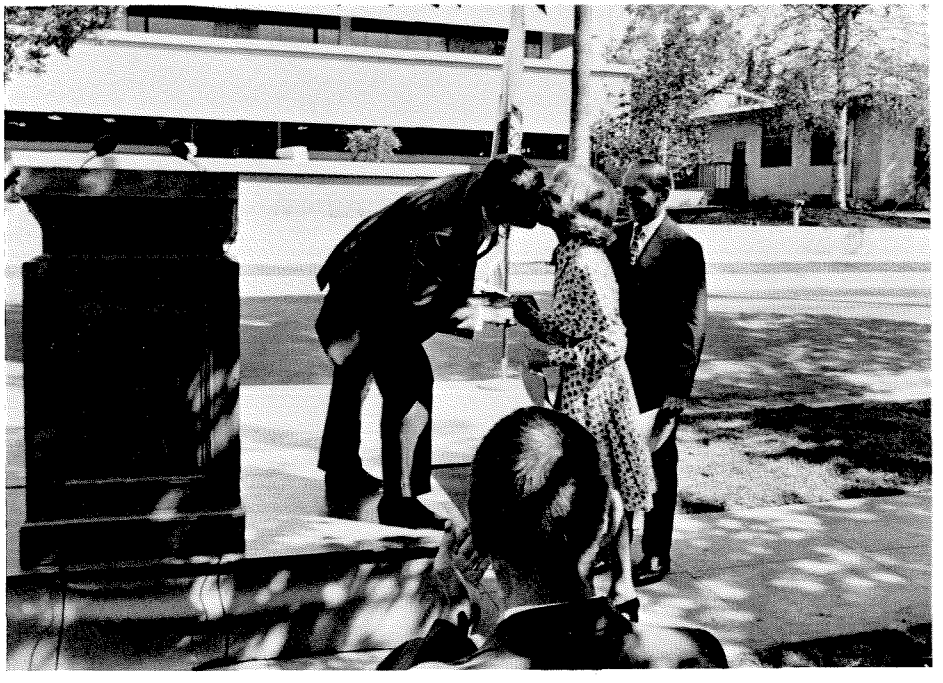
The Summer at Caltech



President Harold Brown expresses his personal appreciation to Marion Jorgensen at the dedication of Caltech's new Jorgensen Laboratory.

Jorgensen Dedication

Caltech's new $1.6 million Earle M. Jorgensen Laboratory of Information Science was dedicated on one of the warmest September 13's in Pasadena history—109 degrees. Fortunately, there was some shade. Guests for the occasion sat under the trees in front of Winnett Center directly across San Pasqual Street from the new building, which is named for a long-time benefactor of the Institute. Earle Jorgensen has been a trustee since 1957 and also contributed funds for the Mosher-Jorgensen graduate student house.

Mr. and Mrs. Jorgensen were the major contributors of funds to build the new laboratory. Other donors included the Booth-Ferris Foundation, Bethlehem Steel Corporation, Mr. and Mrs. Donald Bren, Dart Industries, Inc., the Irvine Foundation, Kaiser Steel Corporation, Mr. and Mrs. William Martin, Mr. and Mrs. Kenneth Norris, Republic Steel Corporation, and Mr. and Mrs. Henry Salvatori.

Francis Clauser (BS '34, MS '35, PhD '37), chairman of the division of engineering and applied science, presided over the dedication. Like Clauser, the two main speakers were students here in the early 1930's, hold three degrees apiece from the Institute, and are now faculty members in the division. Gilbert McCann (BS '34, MS '35, PhD '39), who described computer science at Caltech, is professor of applied science. A brand-new professor of engineering, John R. Pierce (BS '33, MS '34, PhD '36), gave the main address, "The Challenge of the Do-able."

Jorgensen Lab's 30,000 square feet of floor area more than doubles Caltech's space for computer processing. It will house the man/machine interactions laboratory for study of the most effective ways that computer systems can extend man's capabilities. There are also facilities for computer research into management information systems, effective ways of integrating computers and research teams, and improvement of educational techniques. Offices, conference rooms, and space for card-deck storage complete the three-story building.

Independent Study

The Independent Study Program (ISP), thoroughly debated for nearly three years, has finally found its way into the Caltech catalog as a new academic option. The program is designed to take maximum advantage of the intelligence and curiosity of Caltech students by allowing them to combine existing courses with self-scheduled studies to meet personal educational goals.

Undergraduates are eligible for admission to the program any time after the first term of the freshman year. A student who wants to enroll in the ISP must write a proposal describing his goals, reasons for applying, a general plan for study while at Caltech, and a detailed plan for the next quarter. The student must also recruit three faculty members, representing at least two divisions, who approve of his plans and agree to act as an advisory committee. The advisory committee will bear the chief responsibility for overseeing the progress of the student, counseling him, and evaluating his performance and progress—in writing—each quarter.

The program is administered by the nine-member ISP faculty committee which considers each program proposed by a student in consultation with the prospective members of the student's advisory committee. If the program is accepted, a three-party written contract is drawn up and signed by the ISP committee, the three-man advisory board, and the student. This contract includes the agreed-upon content of the student's program and the methods for ascertaining satisfactory progress for those parts of the program that are not standard Institute courses. When—and only when—the ISP committee is satisfied that the terms of the student's contract have been met, he will be recommended for graduation.

In most cases the student's work will be graded on a pass-fail basis, and if he chooses this method, his credentials for graduate school or employment will be based on an extensive record or portfolio of his work under the ISP. If the student prefers the normal grading procedure, his grade-point average will be calculated as usual.

The ISP committee has been highly selective in screening candidates. Of the nearly 40 students who have applied, only three have been accepted so far. They are senior Lance Optican and sophomores Barry Cipra and Bruce Jacobson.

Optican was a physics major for three years before deciding to change his research to the human visual system with emphasis on the study of depth perception. Through the ISP he can pursue his new studies in biology without the complications inherent in switching options so late in his academic career.

Cipra, considered a particularly brilliant student as a freshman, has set up a tutorial scheme for his own education. His first term under the ISP consists of five self-designed tutorial courses in English, mathematics, and physics.

Jacobson is concentrating his research efforts on environmental biology and neuro-psychobiology.

Each of the ISP scholars has put together an impressive group of advisers who are equally impressed by the students and their plans. Optican's advisory committee consists of Carl Anderson, professor of physics; Max Delbrück, Albert Billings Ruddock Professor of Biology; and Derek Fender, professor of biology and applied science. Cipra's advisers are J. Kent Clark, professor of English; Richard Dean, professor of mathematics; and Richard Feynman, Richard Chace Tolman Professor of Theoretical Physics. Jacobson's group includes George Hammond, Arthur Amos Noyes Professor of Chemistry; Dan McMahon, assistant professor of biology; and James Morgan, professor of environmental engineering science.

The ISP faculty committee consists of Barry Barish (chairman), Fred Anson, H. F. Bohnenblust, Peter Goldreich, Floyd Humphrey, James Knowles, Gerry Neugebauer, Thayer Scudder, and William Wood.

Happy Birthday

From July 19 through 21 more than a hundred physicists and astronomers gathered in Cambridge, England, to give William A. Fowler a present for his 60th birthday—a symposium on supermassive objects in astrophysics.

At least a third of the invited guests had some past or present connection with Caltech, where Fowler is now Institute Professor of Physics. Most had close ties with Fred Hoyle's Institute of Theoretical Astronomy (IOTA) at the University of Cambridge where Fowler has been a visiting fellow each summer since 1967. (Hoyle is, in turn, a visiting associate in physics at Caltech.)

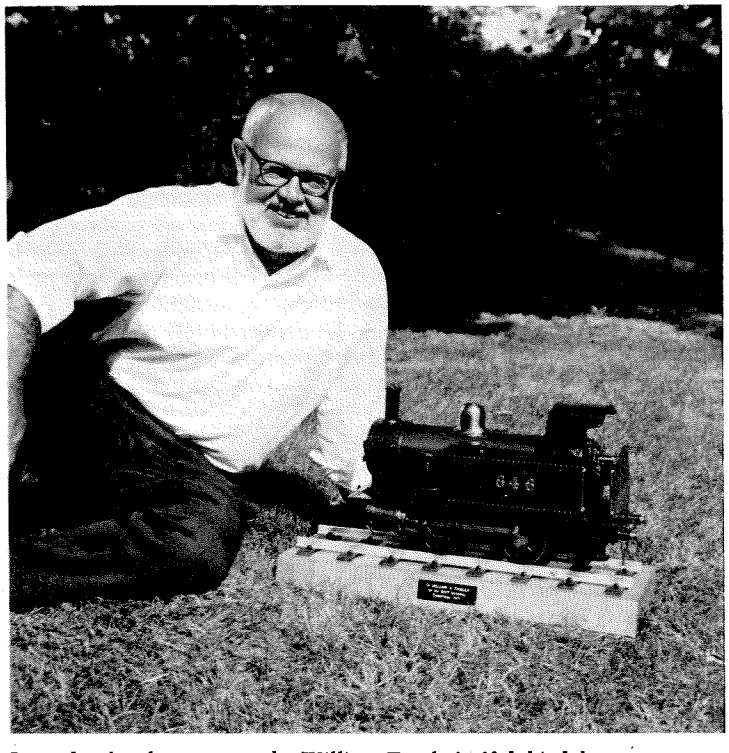
Fowler, who has been a Caltech faculty member since 1936, is credited with contributing more than anyone else to the understanding of why stars shine on nuclear energy and the origins of their chemical elements. He has already been widely honored for his contributions in low energy nuclear physics, astronomy, and astrophysics.

One of Fowler's Caltech colleagues, W. L.W. Sargent, professor of astronomy, was an organizer of the supermassive birthday fete. His associates in planning the symposium included Geoffrey Burbidge, internationally known astrophysicist from the University of California, San Diego; Martin Rees of the IOTA staff; and Donald Clayton of Rice University's department of space science. Clayton received his PhD in physics under Fowler in 1962.

Sargent and Kip Thorne, professor of physics, were among the symposium chairmen. Charles Barnes, professor of physics, gave a review of recent experimental research in astrophysics, much of which has originated in Kellogg Laboratory. Peter Goldreich, professor of planetary science and astronomy; and Gary Steigman, a research fellow in Fowler's Caltech stellar interiors and nuclear synthesis (SINS) group, also played a part in symposium activities.

The papers presented at the conference covered three important areas of Fowler's astrophysical interests: general relativity and cosmology, quasi-stellar objects and supermassive stars, and nucleosynthesis in stars—particularly massive stars. Fowler himself spoke at the closing session of the symposium about some of his and Hoyle's ideas on supermassive objects.

A summary of the conference, written by Virginia Trimble, appeared in the August 27 issue of the British science magazine, *Nature*. (Dr. Trimble, who received her PhD in astronomy at Caltech in 1968, is a staff member of IOTA.) A complete account of the proceedings will not be published because of the unique nature of the symposium. Its purpose was to encourage free discussion of new ob-



Just what he always wanted—William Fowler's 60th birthday present.

servations and ideas, some of which have been only partially developed. Participants were encouraged to be as speculative as they wished.

On July 20 about 160 men and women honored Fowler at a dinner in the Great Hall of Trinity College. Among the 30 guests at the head table were the Hoyles, the Burbidges, and the Fowler family (with Fowler himself seated directly below the famous Holbein portrait of Henry VIII). At the other tables were many of Fowler's oldest and closest friends—some from the Continent, including Paul Ledoux of the Institut d'Astrophysique in Liège, Belgium, and Livio Gratton of the Laboratorio di Astrofisica of Frascati, Italy.

Fowler was presented with a special gift, which he describes as "a dreamy 3½-inch-guage live-steam model locomotive!" According to reports, it was more than a week after the big celebration before Fowler—a long-time steam engine buff—had a chance to try out his locomotive and ride behind it on the elevated tracks of the Cambridge Model Engineering Society.

He has since applied for membership.

Harold Z. Musselman 1895-1971

Harold Z. Musselman, 75, director of physical education and athletics, emeritus, died on August 29. He first came to Caltech in 1921 at the invitation of Robert A. Millikan to be a coach and part-time YMCA secretary. Because of the growing athletic program, his YMCA duties were dropped after two years, and in 1924 he became coach and manager of athletics. He was made director of athletics in 1947, and—after 45 years of service—retired in 1966.

Hal Musselman was born in Kent, Illinois, in 1895. He graduated from Cornell College in Iowa in 1920, and later did graduate work at the University of Illinois and USC. During World War I he was an army sergeant, and in 1919 was a member of the U.S. baseball team in the Inter-Allied games in Paris.

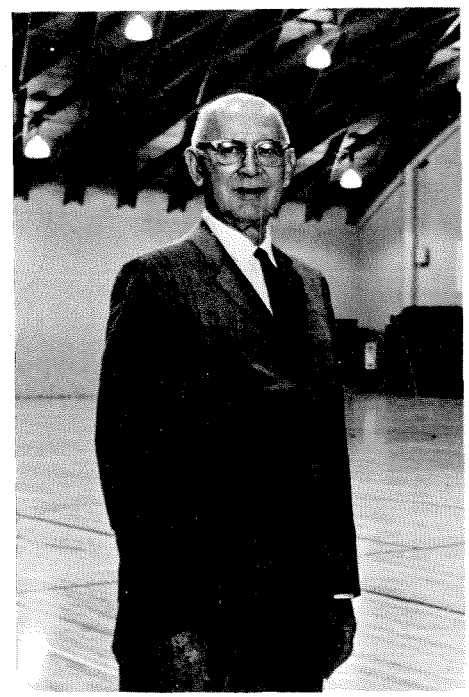
At Caltech, Musselman was varsity baseball coach for 26 years, and he also served as varsity basketball and assistant football coach. He felt that any Caltech student who wanted to participate in intercollegiate competition should have the opportunity to do so, and he maintained an athletic program designed to make this possible. He also provided Institute athletes with opportunities in such sports as karate, soccer, rugby, cricket, and fencing.

For 11 years Musselman was president of the Southern California Intercollegiate Athletic Conference Coaches and Managers Association. He was a member of the Tournament of Roses Association for 19 years, and in 1932 he managed the Olympic cycling races at the Rose Bowl.

Caltech's first gymnasium was dedicated in 1955, and in giving a tribute to Musselman at the memorial services held in Pasadena on September 1, 1971, his fellow graduate of Cornell College—and president emeritus of Caltech—Lee A. DuBridge, recalled: "I never saw a happier man than Hal on the first day I visited him in his new office over there.

"Being an athletic coach at Caltech is hardly one of the easiest jobs in the world. Winning teams are few and far between, and only occasionally does a real star athlete decide to come to Caltech.

"And yet I have the impression that Hal enjoyed every minute of his 50 years of association with Caltech. The academic faculty members, of course, taught the students science, engineering, and the humanities. But from Hal they learned about sportsmanship, about fair play, about keeping a stiff upper lip in the face of defeat and discouragement—and



Harold Musselman

humility in the face of success. He taught, by example, the qualities of friendship, respect for the other fellow, and the joys of keen and friendly competition. More than a dozen generations of Caltech undergraduate students will remember Hal Musselman with affection and respect."

John Hall, 1944-1971

John Hall, a graduate student in geology and the resident associate of Ricketts House, was killed August 1 during a mountain climbing expedition in Canada. He was 27.

At Caltech, Hall was doing research on stable isotope analysis with Samuel Epstein, professor of geochemistry. A graduate of Reed College in Oregon, Hall came to Caltech in 1967 after two years at Harvard Medical School. He received an MS degree here in 1970.

In the summer of 1970 he was the leader of a team of four "chambernauts" who were sealed in a simulated space laboratory for 90 days to test regenerative systems and provide other information for Skylab 1, which NASA will launch in 1973 (*E&S,* February 1971).

Hall, an experienced climber, was leader of a party that had just successfully scaled 19,800-foot Mt. Logan in the Yukon. The group had begun the first stage of an ascent up nearby Mt. St. Elias when Hall and three companions were buried under an avalanche.

Faculty and Administrative Changes 1971-1972

ADMINISTRATION

NORMAN H. BROOKS—*academic officer for environmental engineering science*
NORMAN H. HOROWITZ—*executive officer for biology*
STIRLING HUNTLEY—*associate dean of graduate studies*
ROBERT A. HUTTENBACK—*acting chairman of the division of humanities and social sciences*
JAMES K. KNOWLES—*academic officer for applied mechanics*
LESTER LEES—*director of the Environmental Quality Laboratory*
C. J. PINGS—*vice provost and dean of graduate studies*
CHARLES RAY—*acting director of the Booth Computing Center*
WILLIAM P. SCHAEFER—*registrar*
BRADFORD STURTEVANT—*executive officer for aeronautics*
GERALD B. WHITHAM—*executive officer for applied mathematics*
CHARLES H. WILTS—*executive officer for electrical engineering*

PROMOTIONS

To Professor:
CHARLES B. ARCHAMBEAU—*geophysics*
DONALD S. COHEN—*applied mathematics*
FRED E. C. CULICK—*jet propulsion*
FLOYD B. HUMPHREY—*electrical engineering*
TOSHI KUBOTA—*aeronautics*
JAMES W. MAYER—*electrical engineering*
ALAN T. MOFFET—*radio astronomy*
DUANE O. MUHLEMAN—*planetary science*
W. L. W. SARGENT—*astronomy*
BRADFORD STURTEVANT—*aeronautics*
OLGA T. TODD—*mathematics*
THOMAS A. TOMBRELLO—*physics*

To Associate Professor:
JESSE L. BEAUCHAMP—*chemistry*
ROBERT G. BERGMAN—*chemistry*
LOUIS BREGER—*psychology*
WILLIAM R. COZART—*English*
WILLIAM A. GODDARD—*theoretical chemistry*
D. L. GOODSTEIN—*physics*
RICARDO GOMEZ—*physics*
A. P. INGERSOLL—*planetary science*
GARY A. LORDEN—*mathematics*
FRANK J. SCIULLI—*physics*
EDWARD C. STONE—*physics*
DAVID B. WALES—*mathematics*
JAMES A. WESTPHAL—*planetary science*

To Assistant Professor:
GEOFFREY FOX—*theoretical physics*
H. H. KISILEVSKY—*mathematics*
G. R. ROSSMAN—*mineralogy and chemistry*

To Senior Research Fellow:
JOHANN ARBOCZ—*aeronautics*
ELSA M. GARMIRE—*applied science*

NEW FACULTY MEMBERS

Professors:
JOHN R. PIERCE—*engineering*, from Bell Laboratories
CHARLES R. PLOTT—*economics*, from Purdue University
JAMES P. QUIRK—*economics*, from the University of Kansas
JEAN-PAUL REVEL—*biology*, from Harvard University

Associate Professor:
DAVID M. GRETHER—*economics*, from Yale University

Assistant Professors:
JOHN FEREJOHN—*political science*, from Stanford University
ALEXANDER FIRESTONE—*physics*, from Lawrence Radiation Laboratory
THOMAS C. MC GILL—*applied physics*, from Princeton University
W. DAVID MONTGOMERY—*economics*, from Harvard University
WILLIAM H. WEINBERG—*chemical engineering*, from the University of Cambridge

RESIGNATIONS

JOHN H. BAHCALL—*associate professor of theoretical physics*, to the Institute for Advanced Study, Princeton University
DAVID W. BOYD—*associate professor of mathematics*, to the University of British Columbia's mathematics department
KENNETH D. FREDERICK—*assistant professor of economics*, to Resources for the Future in Washington, D. C.
ROGER C. NOLL—*associate professor of economics*, to The Brookings Institution in Washington, D. C.
JAMES M. VARAH—*assistant professor of applied mathematics*, to the University of Columbia's computer science department

ON LEAVE OF ABSENCE

ROBERT BATES—*assistant professor of political science*, to conduct research in central Africa
FELIX BOEHM—*professor of physics*, to do research at CERN in Geneva, Switzerland
NORMAN BROOKS—*professor of environmental science and civil engineering*, to Scripps Institute of Oceanography
FRED CULICK—*professor of jet propulsion*, to do research and writing
DEREK FENDER—*professor of applied science and biology*, to do research at other institutions
STEVEN FRAUTSCHI—*professor of physics*, to do research at CERN in Geneva, Switzerland
MURRAY GELL-MANN—*professor of physics*, to do research at CERN in Geneva, Switzerland
ROY GOULD—*professor of electrical engineering and physics*, to the research division of the United States Atomic Energy Commission in Washington, D. C.
HAROLD LURIE—*professor of engineering science*, to the Yankee Atomic Electric Company at Newton Center, Mass.
YORIKIYO NAGASHIMA—*senior research fellow in physics*, to do research at National Accelerator Laboratory in Illinois
JEROME PINE—*professor of physics*, to do research and study
G. WILSE ROBINSON—*professor of physical chemistry*, to do research in photobiology