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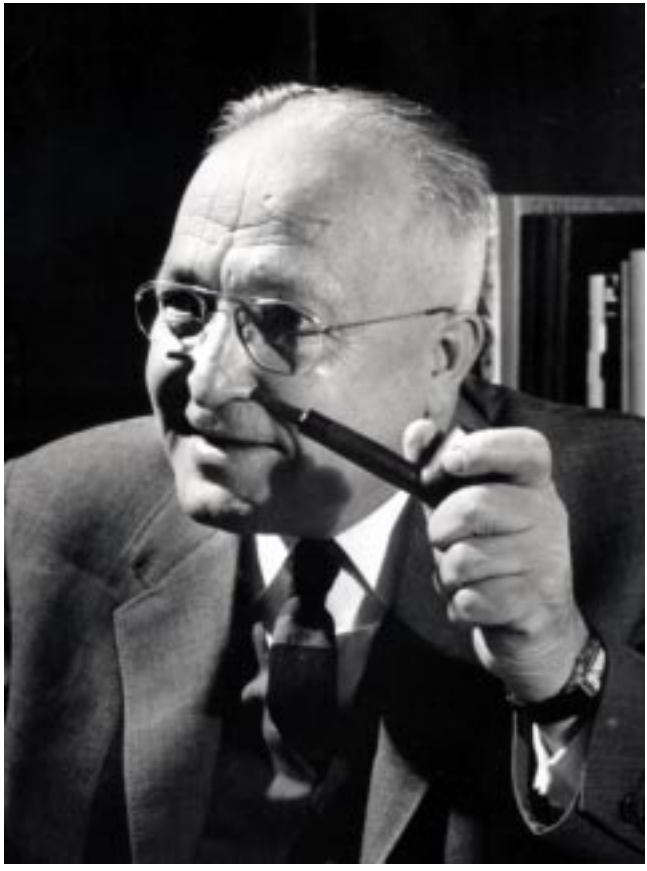

J. C. Warner

JOHN C. WARNER

May 28, 1897–April 12, 1989

BY TRUMAN P. KOHMAN

JOHN C. WARNER, ALMOST universally known to friends and even professional associates as "Jake," was proficient as a scientist, an educator, and an administrator. He was affiliated for most of his career with the Carnegie Institute of Technology in Pittsburgh, Pennsylvania, and as president he was responsible for its growth to the status of a major technological and research university, preparing the way for its metamorphosis into Carnegie-Mellon University. In addition, he was prominent in many civic activities of Pittsburgh and in many national and international scientific activities.

Jake, born on May 28, 1897, on a farm near Goshen, Indiana, was the second of five children of Elias and Addie Warner. His grandfather William Warner emigrated from Saxony about 1850, settled in Indiana, and married Elizabeth Enders. His father operated a farm and in winters worked as logger and lumberman. When Jake was eight his father died. He recalled, "Mother, who was left with few financial assets, was a loving, determined person who convinced us of the work ethic and somehow kept her family together." Jake and his older brother worked before and after school and during summers.

His mother, Addie Plank Warner, had been a country schoolteacher before marriage, and was always a source of encouragement for scholarly achievement. His primary edu-

cation was in one-room rural schools, followed by high school in Goshen. His work outside school shifted from farm to furniture factory, where he became a cabinetmaker during high school. He decided to prepare for a career in science because of the influence of an able and inspiring teacher of chemistry and physics in Goshen High School, Mr. G. W. Warner (no relation).

Entering Indiana University, Jake earned most of his college expenses, continuing as a cabinet worker the first two summers and concentrating in chemistry. He began his career as a chemist in 1918 with the Barrett Company in Philadelphia, returning to the university to complete his undergraduate work for the A.B. in 1919 and the M.A. in 1920. That year he joined the Cosden Oil Company in Tulsa, Oklahoma, as a research chemist. The following year he again returned to the university as a graduate student (1921-23) and instructor in chemistry (1922-23). Under the supervision of Professor O. W. Brown he earned the Ph.D. degree in 1923. In 1924 he became a research chemist for Wayne Chemicals Corporation in Fort Wayne, Indiana.

On June 17, 1925, in Huntington, Indiana, Jake Warner married Louise Hamer, a daughter of William Hamer of that city. They had two sons, William Hamer Warner and Thomas Payton Warner, three grandchildren, and five great-grandchildren. Louise died in 1981, and Jake followed her eight years later.

According to Warner, "My principal avocations seem to center around music—a good listener and a poor performer—and activities in support of civic and cultural enterprises." He was also fond of golf, the theater, and family vacations on the Maine coast.

Warner began his academic career at the Carnegie Institute of Technology in Pittsburgh in 1926 as an instructor in chemistry. He rose through the ranks to assistant professor

(1928-33), associate professor of theoretical chemistry (1933-36), associate professor of metallurgy (1936-38), and professor of chemistry and head of the department (1938-1949).

From 1943 to 1945 he took leave from the Carnegie Institute of Technology to supervise research on the chemistry and metallurgy of plutonium for the Manhattan Project. I met him on a visit to Glenn Seaborg's Plutonium Chemistry Division of the Metallurgical Laboratory at the University of Chicago while he was coordinating inter-site research.

Returning to Carnegie Tech in 1945, he undertook a vigorous rebuilding and expansion of the chemistry department, and I, among others, was brought aboard in 1948. He also served as dean of graduate studies from 1945 to 1950. In 1949 Warner, in anticipation of the retirement of President Doherty, was appointed vice-president and president-elect, and on July 1, 1950, he became president, which office he occupied until February 1, 1965. During his presidency the institute experienced a remarkable development of the quality of its academic work and of its reputation, especially in engineering, the physical sciences, and the social sciences. Major factors were Warner's deep understanding of science, insistence on excellence, and ability to appoint strong academic and administrative leaders.

Likewise, there was a considerable academic and physical expansion. This included the establishment in 1950 of the Graduate School of Industrial Administration, which developed into a source of significant innovations in American and European business education. In 1948 a nuclear research center with a large synchrocyclotron was established at neighboring Saxonburg. Chemistry and metallurgy continued to grow in strength along with physics, and the engineering departments were developing the application of computers to teaching, research, and design. It is no accident that during Warner's presidency six faculty members were ap-

pointed who subsequently were awarded Nobel Prizes on the basis of work done at least in part at Carnegie Tech or its successor Carnegie-Mellon University.

Warner recognized the opportunities and challenges of the computer revolution, and in 1956 he established the Computation Center, one of the earliest in academia. This soon became one of the principal government centers for the development of computer science, and it has continuously pioneered in computer science and applications.

A number of new academic buildings were also constructed during his presidency, including the Graduate School of Industrial Administration, the Hunt Library, and the campus activities center known as Skibo, the third campus building to bear the name of Andrew Carnegie's estate in Scotland. Early in the 1960s the Scaife family pledged a sizable sum toward the construction of a new administration building on the campus. Warner actively participated in its planning, of course not realizing that it was to be named Warner Hall at its dedication in 1966.

Warner was active in a number of international educational projects. In 1962 he was influential in the establishment of the U. S. Agency for International Development's Kanpur Indo-American Program with a consortium of nine U. S. universities and institutes of technology to assist in the development of the Indian Institute of Technology in Kanpur. In 1963 I was a participant from Carnegie Tech as visiting professor of chemistry. Jake and his wife visited the Kanpur IIT and my family and me during that year.

In 1960 there had been some discussions among Paul and Richard Mellon, Warner, and James Board, chairman of the CIT Board of Trustees, about a possible merger between CIT and the Mellon Institute of Fundamental Research, located about a half-mile from the CIT campus. These discussions proceeded intermittently for several years,

involving also CIT Senior Vice-President Edward Schatz. They ultimately led to an agreement in 1966 between Guyford Stever, who had become president of CIT following Warner's retirement, Allen Fischer, the new chairman of the Board of Trustees of CIT, and Paul Mellon, chairman of the Board of Trustees of the Mellon Institute, to effect a formal merger. This was accomplished on July 1, 1967, when the newly merged institution took the name Carnegie-Mellon University.

Warner's door was always open to staff and faculty and even students. With his infectious, cheerful smile he retained the open and direct manner that was his heritage from his boyhood experiences. He preferred informality and a minimum of paperwork. These attributes explain why it was so natural for his colleagues to call him "Jake." His wife, Louise, was an excellent partner to the president, active on the campus scene, and warmly regarded by faculty, students, and the Pittsburgh community.

Warner retained a keen interest in the further development of the university after his retirement and until his death in April 1989 at the venerable age of ninety-one.

SCIENTIFIC ACTIVITY

Following his graduate studies, all of Warner's published scientific work was done at the Carnegie Institute of Technology.

Organic Chemistry. Warner's Ph.D. thesis work under the supervision of Professor O. W. Brown at Indiana was on the electrolytic preparation of ortho- and para-amidophenol.
In work with W. J. Svirbely it was determined how the electric moment of a mono-substitute benzene derivative influenced the position of the next substitution.
Physical Chemistry—General. Several studies had to do with physical properties of compounds and solutions. With D. S.

McKinney and P. Fugassi he co-authored a review of the definition of pH and extension of the acidity scale to non-aqueous systems.

Physical Chemistry—Equilibrium. Several studies were made of binary and ternary organic systems to determine conditions under which ideal behavior is approached.

Physical Chemistry—Kinetics. Warner considered that his most important contributions to science were those dealing with electrostatic effects on the rates, activation energies, and other aspects of chemical reactions in solution. A study with F. B. Stitt of the classic conversion of ammonium cyanate into urea found that the negative salt effect is of the magnitude predicted by Brönsted theory for univalent ion-ion collisions, indicating that collisions between NH_4^+ and OCN^- are responsible. With E. L. Warrick it was found that in mixed solvents the primary salt effect and dielectric constant influence are in good agreement with theory.

With several graduate students the kinetics of a number of reactions in aqueous, nonaqueous, and mixed solvents were studied and rate constants determined, with particular attention to salt and medium effects. By varying the temperature, the "critical increment" or activation energy was determined for many of them. In 1940 Warner published a review of activation energies in solution reactions. These studies continued until 1953, yielding mechanisms, solvent effects, rate constants, activation energies, frequency factors, and effects of structure, with the objective of determining the validity and limitations of various theories.

Metallurgy and Materials. Warner's first publication, with O. W. Brown and S. V. Cook, was on the effect of grinding on the apparent density of lead oxides, an apparently trivial matter but of importance in the construction of storage batteries. His interest in metals was principally in their corrosion, including theoretical aspects and practical matters

such as inhibitors and passivators. In 1942 he edited and wrote, with colleagues in his department, a complete revision of Leighou's *Chemistry of Engineering Materials*. In 1951 he was invited to give the Perrin Memorial Lectures at the Indian Institute of Metals in Calcutta. The six lectures on iron, steel, corrosion, etc., and engineering education were published in book form.

Manhattan Project. In 1943 Warner was asked to serve on the Manhattan Project to coordinate the work on plutonium chemistry and metallurgy, and in February 1944 he moved to Chicago with his family. With an office in the so-called Metallurgical Laboratory he made frequent visits to the various laboratories there and to the Clinton Laboratory at Oak Ridge, Tennessee (Site X), the Los Alamos Laboratory in New Mexico (Site Y), the Monsanto Research Laboratory in Dayton, Ohio, and the Ames Project at the University of Iowa.

Warner became intimately involved in an effort to prepare plutonium metal of extreme purity with respect to light elements that emit neutrons under bombardment with alpha particles, which are emitted in profusion by ^{239}Pu. When this objective was virtually achieved it was discovered that ^{240}Pu, which is produced along with ^{239}Pu by second-order neutron capture, emits copious neutrons accompanying its spontaneous fission. The fission bomb design would have to cope with this, so that the neutron emission from impurities became moot. At the request of General L. R. Groves, director of the Manhattan Project, a survey volume of this phase of the project was prepared with C. A. Thomas as editor, Warner as assistant editor, and many contributors. According to Thomas, "The compiling and rewriting of the original manuscripts was largely the work of Dr. J. C. Warner."

Warner was then given responsibility for directing the

writing of the proceedings of the Metallurgical Project, which ultimately became a major part of the National Nuclear Energy Series. With J. E. Vance, Warner edited and wrote three chapters of a volume on uranium technology. He was the chief editor of a volume on metallurgy of uranium and its alloys, writing one chapter. These activities engaged him for several years.

The Warner family returned to Pittsburgh in September, 1944, but Warner continued his close involvement until October, 1945, when he resumed his professorship and chairmanship of the Department of Chemistry and became dean of the Graduate School at the Carnegie Institute of Technology. From 1952 to 1964 Warner served as a member of the General Advisory Committee to the Atomic Energy Commission.

EDUCATIONAL ACTIVITY

Many of Warner's later publications were addresses or writings on education at all levels. He believed that preparation for careers in science and engineering must begin in the secondary schools, and he attributed his successful beginning to the inspiration of his high school science teacher. Unfortunately, he felt, many otherwise good teachers are hampered and restricted in methodology and objectives by school administrations. Too many science courses are superficial surveys, and mathematics is commercial arithmetic. To insure adequate scientific and engineering manpower we must provide gifted young men and women with competent and inspiring teachers by paying attractive salaries. Science instruction should emphasize basic principles rather than extent of coverage, scientific methodology, and application of the basics to the solution of problems in new situations. Mathematical training should emphasize the state-

ment of real problems in mathematical terms rather than mere memorization of formulas and rules.

At the college level, Warner was concerned that scientific education was often too specialized. He felt that technical instruction should be accompanied by a major component of humanities and social sciences, to provide a philosophical outlook and breadth of knowledge and ability to deal with the human, economic, and social aspects of the scientist's work. Accordingly, he became a strong advocate of the Carnegie Plan of Professional Education, pioneered by his predecessor President Robert Doherty. This had been developed to correct the former almost exclusive emphasis on technology in engineering education, but was extended to include education in science and then undergraduate education generally. Warner emphasized that professional education must be aimed at equipping students to continue learning after graduation and to grow throughout their lives in professional and personal stature. Analytical thinking, problem solving, and communication skills should be vital components of professional education. Research should be incorporated into the undergraduate curriculum to enable the student to solve progressively larger problems and to provide incentive to go on learning.

In the course of his teaching of chemistry at the Carnegie Institute of Technology Warner authored or co-authored several textbooks and problem and laboratory manuals. The most significant was *General Chemistry* by T. P. McCutcheon, H. Seltz, and J. C. Warner, which went through several editions.

CIVIC ACTIVITIES

Another theme of many of Warner's later publications was the relationship between science and society. He believed that the scientific method is the most efficient yet

devised for the generation of knowledge and its application to the betterment of mankind through solutions to complicated social, economic, and political problems. Properly trained professional people could help to provide these solutions, but all educated persons should possess familiarity with scientific methodology. Accordingly, society must provide adequate support for educational institutions, and intellectual freedom must be ensured. Only then can individuals develop to the limits of their capacity.

Throughout Warner's presidency of the Carnegie Institute of Technology he was concerned with the Cold War, and felt that maintenance of adequate military strength was essential. In the long run, however, he thought that the winner would be the nation with the best scientists and engineers. He declared, "Perhaps we must set our sights on a world culture, a worldwide expanding economy, and a world of peace under world law . . . One price of freedom may involve some sacrifice of national sovereignty."

He was quite active in civic affairs, particularly in Pittsburgh, serving as a director of the Regional Industrial Development Corporation and a member of the Pennsylvania State Planning Board. He served as a board member of several corporations, a trustee of several cultural and educational institutions, and a consultant to the United States government and those of several foreign countries.

HONORS AND AWARDS

Warner was active in numerous scientific organizations. Among offices held was the presidency of the Pittsburgh Chemists Club (1940-41), the Electrochemical Society (1951-52), the American Chemical Society (1952-53), the Pennsylvania Association of Colleges and Universities (1954-55), and the Universities Research Association (1965-67). He was elected to the National Academy of Sciences in 1956. Among

many awards received were the Pittsburgh Award of the Pittsburgh Section of the American Chemical Society (1945), the Gold Medal of the American Institute of Chemists (1953), the Pittsburgh Junior Chamber of Commerce Man of the Year Award (1958), and the Pennsylvania Award for Excellence in Education (1966). He received honorary degrees from fourteen universities.

I AM GRATEFUL for assistance from several colleagues, particularly Robert Parr, Herbert Simon, and Guy Berry, from Warner's sons, William and Thomas, and from Jennifer Aronson, archives and art inventory specialist at Carnegie-Mellon University Libraries.

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