NATIONAL ACADEMY OF SCIENCES

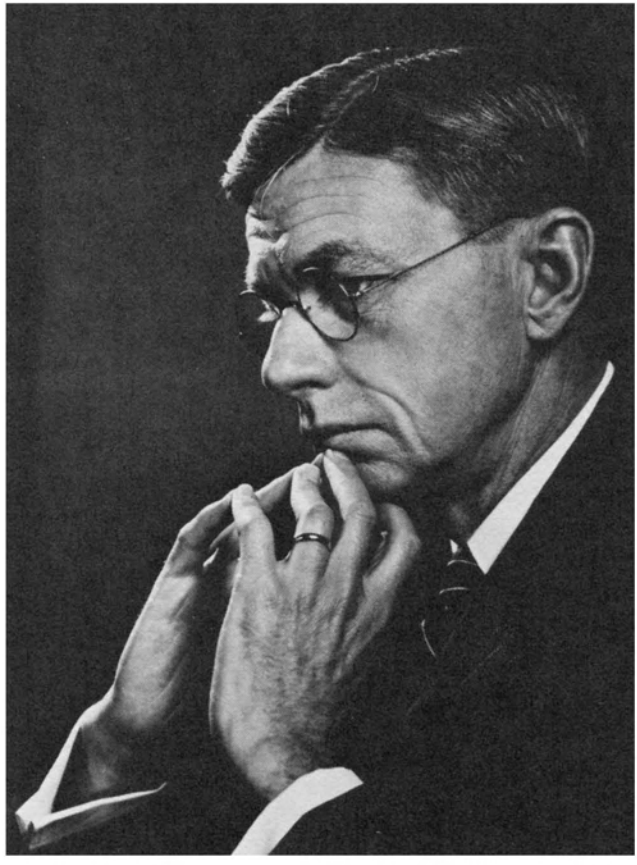
JAMES BRYANT CONANT

1893—1978

A Biographical Memoir by

PAUL D. BARTLETT

Biographical Memoir



Photograph courtesy of Josef Karsh

James B. Conant

JAMES BRYANT CONANT

March 26, 1893–February 11, 1978

BY PAUL D. BARTLETT

THE CAREER of James Bryant Conant covered a remarkably wide range of human concerns. He was a vigorous and prolific organic chemist, devoted to interpreting chemical reactions on a physical level and applying such knowledge to the structures of important natural products, especially chlorophyll. After fourteen years on the Harvard faculty, he served as Harvard's president from 1933 to 1953 and took an important part in organizing the United States scientific effort in World War II. He then served four years as the chief U.S. representative in Germany, first as high commissioner and then as ambassador. In the ten years from 1957 to 1967, he conducted an influential, in-depth study of American secondary education, resulting in a number of books and many important policy recommendations. He provided an account of this many-faceted career in the autobiography, *My Several Lives*.[1]

Conant was born in Dorchester, Massachusetts on March 26, 1893, the third child and only son of James Scott Conant and Jennett Orr Bryant Conant. His father was a man of few words, but with a lively interest in mechanical arts and drawing, who began as a draftsman and then became the owner

[1] James Bryant Conant, *My Several Lives* (New York: Harper & Row, 1970), 791 pp.

of a successful photoengraving company. Visits by young Conant to this establishment and a small shop-laboratory, provided for him at home by his father, were the only links to chemistry in his early environment. His sisters, Esther and Marjorie, eleven and eight years older than he, respectively, were both artistically inclined. His mother had a warm interest in people, in reform, and in transcendental religious movements. Politically she was basically a dissenter.[2]

After six years in public elementary school, Conant was enrolled in the Roxbury Latin School, which was highly rated for its college preparatory courses, including physics and chemistry. The school's greatest asset, for Conant's purpose, was the science teacher Newton Henry Black, who not only gave a stimulating course but helped and encouraged the boy chemist at every turn. He often joined a few students, including Conant, in sandwich lunches at the physics laboratory. Black provided unknowns for Conant to analyze in his home laboratory, suggested outside reading, allowed Conant to use his own laboratory and sensitive equipment, gave career advice, and later coauthored an elementary text, *Practical Chemistry*, with Conant. Black was instrumental in finding a way for Conant to get effective credit for some of his extra work by anticipating the freshman chemistry course at Harvard. Black also provided Conant with a long-range plan including eventual graduate research with T. W. Richards at Harvard. Thus Conant's lifelong interest in secondary education had a background of personal experience of how important this stage can be in the life of a student.

Although his plan called for graduate research with Richards, another contact made during Conant's third and last undergraduate year at Harvard resulted in an important modification. Having a little time (despite being on the editorial board of the Harvard *Crimson*!) and much zeal to get

[2] *Ibid.*, p. 11.

started in research, he arranged to do a special piece of research with Professor E. P. Kohler, newly arrived on the Harvard faculty that year. This essentially extracurricular activity gave such mutual satisfaction that Conant became the assistant in Kohler's advanced organic chemistry course during his first two years in graduate school. He reconciled his newly found enthusiasm for organic chemistry with Black's blueprint for his education by arranging to do a double thesis—two years at "half time" (discounted by the assistantship) with Kohler and one year at full time with Richards. Conant felt that Black never forgave Kohler for this intrusion into a carefully laid long-range plan.[3]

Kohler was a product of Ira Remsen's prolific school of organic chemistry at Johns Hopkins. More than was common in the classical tradition, Kohler was always searching for the rational explanations of organic chemical phenomena. He saw in the developing electronic theory on the one hand, and quantitative experimentation on the other, an escape from dependence on "schools of thought" in the interpretation of chemical phenomena. To all aspects of academic life Kohler brought a rare wisdom and total integrity for which he was respected throughout the Harvard faculty, and which was surely included in Conant's comment "I worked with Kohler so closely as a research student, a teaching assistant, and later as a junior colleague, that I am sure that many of my attitudes and opinions are a consequence of his views."[4]

Conant received his Ph.D. degree from Harvard in 1916, six years after leaving preparatory school. The entry of the United States into World War I brought about rapid changes in the lives of chemists. Conant began the academic year of 1916–1917 in a teaching position at Harvard, which he left for national service, ending at the close of the war as a major

[3] *My Several Lives*, p. 33.
[4] *Ibid.*

in the Chemical Warfare Service. In 1919 Conant became an assistant professor at Harvard. Two years later he married Grace Thayer Richards, daughter of T. W. Richards. This outstanding union was an important source of strength in the shifting scenes of the following half-century. Their honeymoon in continental Europe and Britain was also the occasion for making important scientific and university contacts.

Three of Conant's early papers arose from his summer work in analytical chemistry at the Midvale Steel Company. Beginning in 1919 he turned to research on the mechanisms of some of the reaction types he had encountered during the war. As one thing led to another in his wide-ranging chemical explorations, reaction mechanisms were always a unifying interest. There were many examples of Conant's growing respect for the complexity of reaction mechanisms.

A type of investigation much relied upon by later workers in physical organic chemistry was developed in the studies by Conant, Kirner, and Hussey (1924, 1925) of the reactivity of a series of organic chlorides toward potassium iodide. This study established some reactivity phenomena that had to wait a number of years for final elucidation.

A recurring theme in Conant's approach to reaction mechanisms was the relation between the thermodynamic, or equilibrium, properties of reactions and the reaction rates. He was one of the early organic investigators to face the fact that in some reactions the relations between equilibrium and rate are general and obvious, while in others they are obscure and may even appear nonexistent. Among various equilibrium-rate studies were extensive investigations, mostly with L. F. Fieser (1922–1924), of the reduction potentials of quinones in relation to other reactions. In some of the earlier free radical papers (with L. F. Small and A. W. Sloan, 1926; with N. M. Bigelow, 1928; with R. F. Schultz, 1933) it was shown that bulky aliphatic groups, not in themselves capable

of making a free radical stable, could as α-substituents enhance the stability of the already stabilized xanthyl and other diarylmethyl radicals. In partial analogy to metals, free triarylmethyl radicals were found capable of adding to the ends of unsaturated organic systems (with H. W. Scherp, 1931; with B. F. Chow, 1933), a forerunner of a reaction that became important in later polymer technology.

Conant's interests in structure, reaction mechanisms, and electrochemistry, and his feeling for the important problems of biochemistry, all converged upon the respiratory pigments as a major research challenge in the late twenties and early thirties. The heme structure proposed by Küster in 1910 had survived with some revision in the positions of the sidechains by Hans Fischer. It was still being debated whether methemoglobin, the oxidized form that could be reduced back to hemoglobin but could not carry oxygen, was itself an iron hydroxide or oxide. Conant provided definitive evidence in 1923 (from experiments done with his own hands) that oxyhemoglobin contained ferrous iron, while the prosthetic group of methemoglobin was a ferric compound containing no oxygen on the iron. He continued to be fascinated by the unique properties of the oxyhemoglobin system. He probed the details of the absorption-dissociation curves with oxygen and with carbon monoxide, and the oxidation-reduction potentials of related systems; with searching logic he went about as far as he could go in interpreting the interactions of the subunits of hemoglobin and the ligands involved. Further progress would have to await detailed structures by X-ray spectroscopy and a more refined molecular orbital theory, which later interpreted the geometric changes at iron associated with the attachment of molecular oxygen. One of his last chemical accomplishments was the first separation (with W. G. Humphrey, 1930; with F. Dersch and W. E. Mydans, 1934) of a characteristic chemical prosthetic group from the

nonheme copper respiratory protein hemocyanin, whose role as an oxygen carrier is its only feature in common with hemoglobin.

In collaboration with Norris F. Hall (1927), Conant pioneered the study of "superacid" solutions, in which the absence of bases comparable in strength to water allowed the differentiation of a wider range of acid strengths than was possible in the usual media for acid-base titration. This interest continued and provided a major method of characterizing the different basic centers in the porphyrin ring. Applied to chlorophyll, such titrations (with B. F. Chow and E. M. Dietz, 1934) revealed three distinguishable basicities at different sites. By electrochemical methods, Conant was able to show (with E. M. Dietz, C. F. Bailey, and S. E. Kamerling, 1931; with E. M. Dietz and T. H. Werner, 1931; with E. M. Dietz, 1933) that chlorophyll was a dihydroporphyrin. Just as he was opening out some of the great complexities of this system and its rearrangement products, he made the momentous decision to quit the field of chemistry to become president of Harvard University.

Other chemical research problems that engaged Conant's attention less comprehensively included the pinacol reduction, the effect of steric hindrance on the reaction of Grignard reagents with carbonyl compounds, diazo coupling, special cases of acid-base catalysis, and the effect of high pressure on organic reactions. In three papers on this subject, initially in collaboration with P. W. Bridgeman (1929), and subsequently with C. O. Tongberg (1930) and W. R. Peterson (1932), the room temperature polymerization of isoprene to a synthetic rubber at 9,000 and 12,000 atmospheres was found to be strongly catalyzed by traces of peroxides and inhibited by hydroquinone but capable of proceeding slowly (despite the presence of hydroquinone) even in the most oxygen-free and peroxide-free samples that could be prepared. Later, the use of high pressure by others led to the

important new material, polyethylene. A similarly peroxide-initiated polymerization of *n*-butyraldehyde, analogous to formaldehyde polymerization, was also observed. The poly-*n*-butyraldehyde reverted to monomer at ordinary pressure.

The depth and intensity of Conant's interest in physical, organic, and biochemical research gave little warning to the chemical world of his impending move to the presidency of Harvard University in 1933. For several years before the retirement of President Abbott Lawrence Lowell, there had been general speculation as to his probable successor. A list of the forty candidates considered most probable in Harvard circles did not include the name of Conant. His rise to the top of the list began early in 1933 with a visit from a member of the Harvard Corporation who was much impressed with Conant's clear perception of important educational and administrative issues in the university and his far-sighted views about needed reforms.

The presidency of the university brought an end to Conant's own research and his supervision of graduate students and postdoctoral fellows. But his role as instigator and consultant in some research with G. B. Kistiakowsky and A. B. Hastings kept him involved for several years in week-end conferences. Conant was convinced of the importance of labeling organic compounds with radioactive isotopes. In 1937 the only available carbon isotope for this purpose was carbon-11, with a half-life of about 20 minutes. Despite this limitation, Kistiakowsky and Cramer in 1941 accomplished the labeling of lactic acid at either end with C-11, available for whatever biochemical experiments could be performed in the necessarily short time. Radioactive labeling came into its own a few years later with the availability of carbon-14, a by-product of the atomic energy program.

Conant immediately became as deeply involved in the concerns of the Harvard presidency as he had been in chemistry. In addition, he was drawn rapidly into national

affairs by the force of contemporary world events: the rise of the Nazi movement and the looming threat of World War II.

At Harvard, Conant is remembered for a number of important innovations. In the pursuit of excellence in selection of the faculty, he insisted on the sharp definition of tenure so that an assistant professor who was not promoted at the end of his stated term was automatically terminated as a member of the faculty. The adoption of this practice by other universities has been slow but steady. The National Scholarships, instituted early in Conant's presidency, guaranteed that, for a small number of students selected competitively for their scholastic excellence, lack of money was not a barrier to a Harvard education. A small number of University Professorships were established to recognize exceptional scholars whose contributions transcended the usual limitations of departments and of organized teaching.

These administrative steps were taken early in Conant's presidency. Further progress came after World War II with respect to the educational process itself. After long consideration and faculty debate, new emphasis was placed on "general education" in the major areas of scholarship. Conant himself took part for three years in the teaching of such a course, based on case histories in experimental science. During the postwar period there was an extensive reevaluation of the professional schools; the School of Education, for example, was reoriented toward the training of school administrators rather than teachers. Also under Conant's leadership, Harvard abandoned the anachronistic practice of teaching every undergraduate course twice, once for Harvard men and in a second section for Radcliffe women. With somewhat less unanimity in the Harvard community, women were subsequently admitted to the Medical School—and even to the Law School. Conant also set a pattern for deprofessionalizing intercollegiate athletics by placing it, and its budget, under a

committee of the faculty, abolishing athletic scholarships, and upgrading the status of intramural sports.

There was no escapism in Conant's nature. He was convinced that the rise of Hitler to power was the start of an inexorable chain of events threatening the United States no less than the nations of Western Europe. The seriousness with which he viewed the Nazi threat was illustrated in the first year of his presidency (1933), when Ernst F. S. Hanfstaengl of the class of 1909 offered Harvard a scholarship for a student to spend a year in Germany. To this close friend of Hitler, Conant replied in an open letter: "We are unwilling to accept a gift from one who has been so closely associated with the leadership of a political party which has inflicted damage on the universities of Germany through measures which have struck at principles we believe to be fundamental to universities throughout the world." Conant's long-held conviction of the seriousness of the Nazi threat led, after the invasion of Norway, to an activist position as he became one of the charter members of the Committee to Defend America by Aiding the Allies. He devoted himself to overcoming the isolationism of the day, testifying in favor of the Lend-Lease Bill and promoting an innovative civilian organization for military preparedness, the National Defense Research Committee (NDRC).

The purpose of this organization, set up in 1940 by President Roosevelt under the chairmanship of Vannevar Bush, was to mobilize civilian scientists and engineers for the development of new instrumentalities of war. Financed by the government, the NDRC let contracts for military research and development in academic and industrial laboratories, each one under a principal investigator chosen for his relevant scientific background. This had the effect, a year and a half before the entry of the United States into the war, of bringing to bear a large amount of scientific talent on new and old

problems of war. Problems were chosen in consultation with the military, but in their exploration the great variety of thinking and methodology in the scientific community was free to make its contribution. Conant headed Division B, dealing with chemical warfare, explosives, and many chemical aspects of munitions. Through the NDRC, for the first time, the considered views of civilian scientists on military matters could be heard directly by the government—even when they disagreed with the prevailing military doctrine.

During this period of preparedness—in early March 1941—Conant made a fruitful trip to England, establishing many scientific contacts as well as being received by the king, by Prime Minister Churchill, and by members of the cabinet. This timely initiative led to a rapidly expanding exchange of technical information between the soon-to-be allies.

In the same year a further organizational change created the Office of Scientific Research and Development within the Executive Office of the President, with Bush as chairman. Conant became chairman of the NDRC, which remained the larger part of the new organization, and he acquired direct responsibility for the NDRC work on uranium fission; Conant and Bush became the two technical members of the cabinet-level top policy group supervising the atomic bomb project. On Conant's recommendation in the spring of 1942, this project was expedited by direct, industrial-scale plant construction carried forth simultaneously on four different ways of preparing fissionable material for atomic weapons. Three of the four methods were successful, and all contributed to the successful bomb of 1945.

Also in 1942 Conant served on a committee chaired by Bernard Baruch to review the synthetic rubber program, which was making inadequate progress. After a two-month intensive study, the committee prepared a report that reoriented this program. Before the end of the war the United

States was producing synthetic rubber at the rate of a million tons each year.

While Conant's energies were preempted by these urgent matters of national policy, Harvard was essentially in a holding pattern educationally, while doing as much as possible in the way of research and other services for the government. Conant had felt that giving priority to the war effort was a matter of survival, but when the war was over he reminded the university that its mission of increasing the world's knowledge was incompatible with any continuance of secret or classified research for governmental sponsors. It became firm Harvard policy that all research done at the university must be freely publishable. The real innovation had been the great participation of universities in the war effort; the new policy was a matter of holding that innovation to its historical setting and not letting it get out of hand. Not all universities adopted this position.

In 1946 Conant was invited by President Truman to be chairman of the newly established Atomic Energy Commission. Though declining this appointment, he served actively for the next six years on the AEC's part-time General Advisory Committee under the chairmanship of Robert Oppenheimer. When President Truman in 1950 decided to proceed with development of the hydrogen bomb, it was contrary to a unanimous recommendation of the AEC General Advisory Committee. In the same year, however, the president appointed Conant chairman of the new National Science Board, the policymaking body of the National Science Foundation. Conant was involved in appointing the first director of the NSF, Alan T. Waterman, as well as in guiding the operational policies of the Foundation. These wise policies have undergone only a slow evolution in the intervening decades, although the budget of the Foundation has grown by nearly three orders of magnitude.

In 1950 Conant was the choice of the nominating committee as president of the National Academy of Sciences, of which he had been a member since 1929. The presidency of the Academy had generally been regarded as an honor for which one was chosen and elected without a contest, and Conant accepted the nomination in that spirit. In the meantime, there was a growing opinion among Academy members, spearheaded by the Chemistry Section, that the Academy required a full-time president to meet the challenges of the postwar era. It was felt that Conant—with his many obligations as president of Harvard—would be unable to make such a commitment. After Conant's name was placed before the annual business meeting, members of the Chemistry Section offered the name of Detlev W. Bronk as an alternative. Reached by phone during the meeting by Vannevar Bush in an attempt to resolve the conflict, Conant, unwilling to run against his friend, withdrew his name and Bronk was elected.

During the first term of President Eisenhower, 1953 through 1957, Conant was asked to serve as U.S. high commissioner to Germany and to assume the post of ambassador when the establishment of the German Federal Republic should be ratified. This prospect was so attractive to him that he made it the occasion of his retirement as president of Harvard, obtaining a leave of absence for the second semester of 1952–53, his twentieth year as president. With his long acquaintance with Germany and his appreciation of German science and universities, he was admirably suited for this role in a period of reconstruction. In the course of this assignment he developed warm relations with Chancellor Adenauer and accompanied him on two trips to the United States.

Both the character and the mechanics of this mission to Germany contrasted sharply with Conant's intensive national service during the war. In that grave emergency, American

democracy rallied to the need for expediting important tasks by many new methods. In the diplomatic mill, the democratic system was equally proficient at obstructing uncontroversial undertakings with rules of procedure, checks, and balances. For him to become ambassador it was necessary not only that the Allied Powers ratify the treaty setting up the Federal Republic (which required, in the case of the French, over two years after the signing of the treaty), but also that the United States Senate confirm his appointment as ambassador. This finally occurred more than a week after the ceremony at which the three Allied high commissioners had been scheduled to present their credentials as ambassadors to the new German president. On hearing the reason for Conant's special interim status when he attended this ceremony, the French ambassador remarked graciously that he would have thought such a thing could happen only in France.[5]

As U.S. high commissioner, Conant had the major duty of trimming down an organization larger than Harvard University, preparing it for sudden liquidation at an unpredictable time, and establishing the embassy. The largest diplomatic issue, which continued throughout his time in Germany, concerned the Russians' destruction of the unity of the Berlin occupation and the obstacles this imposed on reconstruction in the Allied zone. Conant made frequent visits to Berlin and did as much as his position allowed to provide solutions to the countless problems that arose. Probably the most satisfying aspect of his role lay in his contacts with the German governmental, educational, and scientific leaders. He addressed many groups in German and was widely appreciated for his understanding of their ways and their problems. All this helped to hold in perspective the occasional harassment in Washington from politicians such as Senator

[5]*My Several Lives*, p. 591.

Joseph McCarthy, who reported that there were, in the libraries of the U.S. Information Agency, 30,000 books by Communist authors, "many of them in Germany." Much was made of this at budget time.

At the end of the first Eisenhower term (1957), Conant resigned as ambassador and turned with vigor to one of his long-standing interests, American secondary education. His final experience in Germany came in 1963, when he was invited by Mayor Willy Brandt and the Ford Foundation to spend a year and a half in Berlin helping with the establishment of a Pedagogical Center, designed to disseminate information about primary and secondary education through conferences and consultations with teachers, school administrators, and professors of education. He probably played a critical role in rallying support for this project. In other ways this stay in Berlin tied together his interests in German culture, science, politics, and education extending over a period of forty years. He unquestionably had an influence on adjustments that have been made in German education to keep it viable during drastic changes in political and intellectual climate.

Between 1957 and 1963, with the support of the Carnegie Corporation, Conant conducted a study in depth of American high schools. He had been keenly aware of the importance of this subject, both as a university president and as a statesman of science. In the first year, he and his staff of four visited 103 schools in 26 states; Conant himself participated in more than half of these visits. The first of the books to emerge from this study was *The American High School Today*, published in 1959, which offered specific recommendations for numerous improvements, especially in the teaching of foreign languages. Since the inclusion of an important degree of scope in the curriculum required a critical size of the faculty, Conant urged consolidation of small high schools

into comprehensive schools. Criticism of American education was widespread at the time in the wake of the launching of the *Sputnik* satellite in 1957, and *The American High School Today* was on the best-seller list for several weeks. The controversy it provoked helped give impetus to extensive school reforms.

The next project was an examination of the schools of the inner cities such as Chicago, Philadelphia, and Detroit and of the suburban areas surrounding them. In the book *Slums and Suburbs* (1961), he warned of the excessive numbers of unemployed and out-of-school black youth, which he called "social dynamite"—a term whose aptness was widely appreciated in the social upheaval witnessed five years later. Although he urged vigorous governmental attention to a problem with which black leaders and white liberals were greatly concerned, he did not embrace the doctrine that the solution required artificial integration of schools where communities themselves were segregated. His solution was rather to correct the financial disadvantage under which many inner-city schools operated. This addressing of the problem as a purely educational and economic, rather than a racial, one cost him the support of some very active groups.

Equally controversial were the conclusions from an examination of teachers' colleges and schools of education. *The Education of American Teachers* (1963) included criticisms of the curricula of these institutions and also urged that certification of teachers be placed in the hands of bodies independent of the schools of education. This book aroused protest among professional educators, an uproar Conant partially escaped by being on his mission in Berlin at the time of publication.

In the last of the reports from this study of education, *Shaping Educational Policy* (1964), Conant urged greater involvement of state administrations in educational policies. An

Educational Commission of the States, recommended in this book, came into being a few years later and has since been useful in shaping consistent educational policies in the participating states. After his return from Berlin in 1965, Conant continued his writing and publishing for several years, spending the winters in New York and the summers in Hanover, New Hampshire.

My own first and principal contact with Conant was as a graduate student at Harvard from 1928 to 1931, during the first of his several lives. At the time of our first interview, in the spring of 1928, his life was complicated by an overdue move from an old, untidy laboratory into a fine new one, and keeping everything organized the while. His most memorable remark on that occasion to his prospective research student was: "Frankly, I'm a slave driver." I took this for the hyperbole that it was; it was already evident from the record that he was in academic chemistry to get things done, but none of his scientific work could have been done by driving slaves. His attitude toward his students and their research problems was always one of open-mindedness. A visit to a coworker in the laboratory would often open with "What's new?" If something interesting was reported, he rarely prescribed the next experiments, but was more likely to ask: "What are you going to do next?" The implied expectation that the student would have good ideas of his own was a constant stimulus toward its fulfillment.

I came to think of Conant as probably the most truly intelligent man I ever knew. For him, objectivity seemed to be a natural state of mind, rather than something for which one must strive. The habit of viewing the world as it revealed itself, rather than as he might wish it to be, was fundamental to Conant's professional, political, and administrative life. The importance of a problem or an activity was something inherent in its place in science or society, and completely

transcended such subjective considerations as one's own pleasure in pursuing it. When, with a full range of choice, he repeatedly moved from a field where he had a strong position into something else not always even closely related, it was in pursuit of a bigger challenge, a more important activity. He chose the chemistry underlying the life process rather than more abstract principles and the conduct of a great university rather than any part of it. He responded to world events calling for rare insight along with decisive action. There was never any appearance of looking back, with the possible exception of a comment in his autobiography that, in retrospect, "the best years" had been those on the Harvard faculty.[6]

Although he probably knew that he could not endow others with his own perceptiveness and mobility in moving to ever more important things, he warned his students of the dangers of becoming too committed to their early research interests. After reading one former student's first independent paper, he wrote: "I hope you will not continue to work in this field. . . ." To another, who showed him a proposed plan for a National Research Fellowship: "If this is completely successful, will it be anything more than a footnote to a footnote in the history of organic chemistry?" Both students took his advice and lived to appreciate its wisdom.

Conant's participation in conventional competitive sports was apparently confined to a short period at the age of nine or ten when he and his boyhood friends had outgrown a preoccupation with toy soldiers and turned to football. During one season he was captain of a successful neighborhood team. As sports had to compete for his leisure time with an interest in electricity, and later in chemical experimentation, the latter's expanding fascination won out entirely by

[6]*My Several Lives*, p. 59.

the time the program at the Roxbury Latin School was well under way.

Although there is no record of any later interest in games or organized sports, Conant always enjoyed vigorous hiking and climbing in the hills of New England. He was aware, however, that the Presidential Range in New Hampshire would not even be called "mountains" in the world's mountain climbing circles. In his forties, while on a family vacation in the Sierra Nevada, he met a Harvard alumnus who skillfully introduced Conant to the techniques and pleasures of rock climbing in a roped party. After describing his bout with terror on the ascent of a 14,254-foot peak, Conant remarked: "If I had but known it, the twenty-four hours which had just passed marked a quantum jump in my psyche. I was ready to become an irrationally enthusiastic mountaineer."[7] In the following two summers he went rock climbing with groups from the Canadian Alpine Club, which brought him intense satisfaction. A year later, a rock climb on Mount Washington in New Hampshire brought a severe back strain that ended his mountaineering as abruptly as it had begun. It is possible to discern in this evolution of Conant's sporting life the same kind of idealism that pervaded his professional life, making him always responsive to the call of something greater, more exciting, or more important. Coming as it did just when he was learning to live without compelling problems of chemical research in which to immerse himself, perhaps the "quantum jump" into intensive mountaineering met a deep and personal need in a timely manner.

The vitality and rational resourcefulness of James Bryant Conant impinged in so many ways on the science, technology, education, and federal policy of twentieth-century America that it is certain that without him these aspects of life today

[7]*My Several Lives*, p. 198.

would have been the worse in a number of important respects.

His health failed in the summer of 1977 and he died in Hanover on February 11, 1978. He is survived by his wife, Grace Thayer Richards Conant, two sons, James Richards and Theodore Richards Conant, and five grandchildren.

THE AUTOBIOGRAPHY, *My Several Lives*, by James B. Conant (Harper & Row, 1970), is the definitive source of much of the information presented here. I am greatly indebted to George B. Kistiakowsky and Frank H. Westheimer, coauthors of the biographical memoir on Conant for the Royal Society. We exchanged notes and manuscripts, and at certain points borrowed phrases from one another. See also G. B. Kistiakowsky, "J. B. Conant," *Nature*, 273(1978):793–95. I thank Dr. Clark A. Elliott, associate curator of the Harvard University Archives, for help in compiling a list of honors and honorary degrees.

HONORS AND DISTINCTIONS

AWARDS

1932 William H. Nichols Medal, New York Section, American Chemical Society
1932 Charles Frederick Chandler Medal, Columbia University
1934 Medal of the American Institute of Chemists
1935 Medal of the Ford Hall Forum, Boston
1936 Commandeur, Ordre National de la Legion d'Honneur
1940 Jewish Veterans' Award for American Leadership
1943 Award for Distinguished Service to American Education, New York Academy of Public Education
1943 Benjamin Franklin Medal, American Philosophical Society
1944 Medal of the Boston City Club
1944 Joseph Priestley Medal, American Chemical Society
1946 U.S. Medal for Merit
1946 Civic Service Medal, Boston City Club
1946 Kentucky Colonel
1947 American Education Award, American Association of School Administrators
1948 Medal for Distinguished Service in the Field of Science, Roosevelt Memorial Association, Inc.
1948 Honorary Commander, Order of the British Empire
1949 Gutenberg Award, Book Manufacturers' Institute, Inc.
1951 Citation for Distinguished and Exceptional Public Service, City of New York
1952 Freedom House Award
1956 Charles Lathrop Persons Award, American Chemical Society
1957 Grand Cross of the Service Order of the Federal Republic of Germany
1959 Woodrow Wilson Award for Distinguished Service, Woodrow Wilson Foundation
1960 Research Institute Award, Research Institute of America
1960 Award for Distinguished Service in School Administration, American Association of School Administrators
1962 Frank H. Lahey Memorial Award for Leadership in Medical Education, Association of American Medical Colleges
1962 Award of the Association of Assistant Principals

1963 Presidential Medal of Freedom
1965 Sylvanus Thayer Award, U.S. Military Academy's Association of Graduates
1965 Great Living American Award
1967 Citation for Distinguished Service to Science Education, National Science Teachers Association
1967 Arches of Science Award, Pacific Science Center, Seattle
1969 Atomic Pioneer Award, President of the U.S. and Atomic Energy Commission
1977 Clark Kerr Medal, University of California, Berkeley

ELECTIVE AND HONORARY MEMBERSHIPS

National Academy of Sciences
Alpha Omega Alpha (medical honor society)
The Chemists' Club
Society of Chemical Industry
Educational Institute of Scotland, Honorary Fellow
American Institute of Chemists
Royal Society, Foreign Member
Royal Institute of Chemistry, Honorary Fellow
American Academy of Arts and Sciences
Deutsche Akademie der Naturforscher Leopoldina
Phi Beta Kappa
Sigma Xi
Alpha Chi Sigma

HONORARY DOCTORAL DEGREES

1933 University of Chicago
1934 Columbia University
Stevens Institute of Technology
Boston University
New York University
Tufts University
Princeton University
Yale University
1935 Amherst College
College of Charleston
University of Wisconsin

1936 College of William and Mary
Oxford University
1938 Williams College
Dartmouth College
1939 Tulane University
1940 University of California
University of Pennsylvania
1941 Queens University
Cambridge University
University of Bristol
1944 University of Algiers
1945 McGill University
University of North Carolina
University of Toronto
1946 University of London
1947 University of the State of New York
University of Illinois
Hamilton College
University of Lyon
Baylor University
University of West Virginia
1948 University of Massachusetts
Northeastern University
1949 Yeshiva University
Wesleyan University
University of Michigan
1950 Swarthmore College
1951 Jewish Theological Seminary of America
University of New Zealand
Canterbury University College
University of Melbourne
University of Adelaide
1952 Colgate University
1954 Birmingham University
Freie Universität Berlin
1955 Michigan State College of Agriculture and Applied Science
Harvard University
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