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# ARTHUR BECKET LAMB

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There are many old New England names in the roster of distinguished American scientific men, and Arthur Becket Lamb earned a place among them at an early age. His ancestors on both sides were Massachusetts people, tracing back to Thomas Lamb, who migrated from near London in 1630 to Roxbury, and to John Becket, who came to Salem some time prior to 1683. The Lamb family were farmers for several generations, devout church people and Minute Men, and the descendants of John Becket were shipbuilders.

Louis and Elizabeth (Becket) Lamb lived in Attleboro, Mass., where the family jewelry manufacturing business was located, and Arthur B. was born to them on February 25, 1880, the second of three sons (Roland older, Leonard younger). Elementary education was thorough but flexible seventy years ago and the Lamb boys benefited from this and also from a scholarly family atmosphere. In 1886 Arthur began school in the second grade. As a result of a school reorganization and some grade skipping he completed elementary school at the age of twelve. In high school he followed the usual college preparatory program of that period: English, Latin, Greek, French, history, algebra, geometry, but not physics, the only natural science then offered in the school. Saturday lessons in drawing were added. German, too, by maternal encouragement, also was studied during spare time. In an autobiographical memoir Arthur Lamb recounted how at first he tried to do problems in algebra by arithmetical methods, but decided that algebra was a science in its own right. He solved all of the problems in the texts in the school library and looked for more. Geometry in its turn was interesting; he worked at trisecting the angle and at constructing a regular pentagon.

Extracurricular study is an important supplement to course work and young Arthur Lamb certainly profited from his spare time. The superintendent of schools was a devotee of astronomy and possessed a six-inch Alvan Clark telescope; algebra and geometry are direct introductions to astronomy. Later the school received by gift an eight-inch Brashear reflector, and the Principal made young Lamb its custodian. Many nights and early mornings were spent in observations on double stars and planets, with the aid of Webb's "catalog." The telescope led to the microscope and the young student read the background literature extensively, including makers' catalogs. With the purchase of the optical parts and operating-adjustment mechanism, the next task was to build the stand, working in his father's "tool room," at the factory. By the end of the summer he had completed a very serviceable instrument. The investment return was two-fold: an experimental knowledge of the otherwise invisible forms of matter, and a working experience with machine tools. A new Principal at the high school introduced him during this period to trigonometry. As to chemistry and physics, he read much of Roscoe and Schorlemmer, the only chemistry text in the school library, and performed many physics experiments. Röntgen's X-ray tube having become well known at this time, he combined a friction generator and a Crookes tube so that after hours of operation enough X-rays had been generated to produce a good shadow picture of a key.

Roland and Arthur Lamb were ready for college at the same time, and the choice of institutions was a perplexing one for the parents. Harvard was considered but passed by, because of reports of its intemperate and unreligious atmosphere. Arthur's high school record was satisfactory to the Massachusetts Institute of Technology, but not his mere sixteen years. Tufts College was the final choice, after consultations with an old family friend, Dean Leonard of the Tufts Divinity School, and he was enrolled in the fall of 1896.

The arts and science college program of sixty years ago provided both general and professional education; it would be interesting and instructive for any modern educator or student to read Arthur Lamb's college program. How many present-day liberally educated graduates have registered for (and survived): Latin, French, German (four courses), English Composition, English Literature, Philosophy, Ethics, Comparative Anatomy, Vertebrate Embryology, Botany, Biology Research, College Algebra, Plane and Solid Analytical Geometry, Differential and Integral Calculus, Descriptive Engineering Geometry, Differential Equations, Quaternions, Newtonian Potential Theorem, General Chemistry, Qualitative Analysis, Quantitative Analysis, Organic Chemistry, Physical Chemistry, Technical and Water Analysis, Fire Assay, Advanced Inorganic and Advanced Organic Chemistry? All of these courses taken in four years, at the small New England college in the then country town of Medford!

It was hard for chemists in later years to believe that Arthur Lamb was a "biology major" in college; under the inspiration of Professor J. Sterling Kingsley he studied comparative anatomy, vertebrate embryology and other fields of zoölogy, spent two summers at the Marine Biological Station at Harpswell, Maine, and in his junior year started a research project on the eye muscles of *Squalus acanthias*, the common dogfish. This work became the basis of his first published paper and his Tufts A.M. thesis. In chemistry he had courses with Professor F. W. Durkee (1861–1939), a teacher with extensive inorganic experience, and began a lifelong acquaintance with that renowned pioneer theoretical organic chemist, Arthur Michael (1853–1942), with whom he studied both inorganic and organic chemistry. Extracurricular activities were limited, but he did have time for social and fraternity affairs, held class offices and as a junior was elected to Phi Beta Kappa. His varied academic program was completed in 1900, and at the age of twenty he received the A.B. degree in course and at the same time the A.M. for his study and thesis on the eye structure of the dogfish.

His undergraduate work completed, Lamb had a difficult decision to make between zoölogy and chemistry for further study. The personality of Arthur Michael prevailed and he chose chemistry for graduate work. Under Michael's direction an attempted synthesis of iodine heptoxide, analogous to the recently prepared chlorine heptoxide, gave metaperiodic acid. Then an unsuccessful effort to make selenium trioxide disclosed an interesting reaction of selenic acid with acetyl chloride. An organic chemistry problem was next: a search for an allo-isomer comparable to the then-known allocoumaric acid.

Following the first year of graduate study, Lamb made a quick trip to Europe by cattle-boat and travelled by bicycle through England and some of the Continent. During the two-year period of chemical work he did not lose his attachment to zoölogy. He found time to attend a course of Lowell Lectures by V. F. K. Bjerknes on hydrodynamics, and to complete adequate research for a short paper on "Mechanics of Mitosis." Summer work at the Harpswell Laboratory was performed on the sand dollar, a repetition of the parthenogenetic experiment which Jacques Loeb had carried out with sea urchin eggs. His second year of graduate study was further complicated by an appointment as half-time instructor to offer advanced courses in organic and inorganic chemistry while Michael was on leave for travel abroad. Naturally the coumaric acid problem did not progress very rapidly, but Michael returned from France in March, advised him briefly and departed for Japan. The organic compounds then became more tractable and the project was finished by the end of the school year.

Although chemistry had been chosen now for his career, he felt the need for more study. A decision was necessary between its various fields and physical chemistry had gained in fascination. During the previous summer in Maine, Lamb had talked at some length with Professor H. N. Morse of the Johns Hopkins University, who at that time was conducting research on osmotic pressure. Now by the end of the summer of 1902, Morse had gained another student (except for registration) and a problem had been chosen.

On the Saturday before his departure for Baltimore, Lamb went to Medford to visit Arthur Michael, who wished him well, and expressed regret that his student was venturing into a field with such poor prospects as physical chemistry. He did approve of Johns Hopkins University, but ended by asking whether Lamb had met T. W. Richards of the Harvard Chemistry Department. On receiving a negative reply, Michael wrote a note of introduction to Dr. Richards and gave his departing student appropriate Cambridge street directions, which were followed immediately. Arthur Lamb found in Theodore William Richards a combination of inspiring scholarly teacher and physical chemistry enthusiast, and returned to Attleboro in a state of perplexity. After a short week-end at home the decision was made and he registered at Harvard Graduate School.

Harvard never was liberal in accepting transfer credit, and Richards' new convert to physical chemistry was required to begin anew at the A.B. level. He enrolled in several graduate courses, including H. B. Hill's course in advanced organic chemistry, but this version of the subject was not the equal of Arthur Michael's and he was not attracted back to his early interest. He began research with Richards and completed a problem on the specific heats of solutions for the Harvard A.M. in 1903. In the summer between his two years at Harvard there was time to make some measurements of the density of zinc chloride solutions under the direction of Gregory P. Baxter.

April of 1904 found Lamb in a race between thesis-finishing and a bad appendix. The thesis was delivered on May 1 and the operation performed the next day. During the preceding two years he had organized his Tufts College graduate research into a thesis, taken the examinations and received the Ph.D. degree from Tufts prior to the Harvard graduation. The Harvard Faculty learned of this, debated the academic aspects of the matter and decided that it was proper to grant him the Harvard Ph.D. also, since the two theses embodied completely different work.

The award of a Parker Travelling Fellowship gave Arthur Lamb a chance to travel in Europe again. He visited Göttingen and Karlsruhe, but enrolled at Heidelberg and Leipzig. At the University of Leipzig he joined the group in W. Ostwald's Laboratory, working in a sub-group with R. Luther. Richards and Gilbert N. Lewis (then at Harvard) had extensively furthered Lamb's growing interest in physical chemistry, and "Ostwald-Luther" solidified it still more. Attendance at lectures by Fritz Haber at Karlsruhe gave further inspiration. This brief encounter with Haber led to the opportunity of translating Haber's book "Thermodynamics of Technical Gas Reactions." Lamb became a member of the Deutsche Chemische Gesellschaft and of the Bunsen Gesellschaft, and his experiences in Germany resulted in a lifelong respect and fellow feeling for the old-time German scholars and teachers, and gave him a fund of reminiscences and anecdotes. On his return in 1905, Harvard appointed him to its staff as instructor in electrochemistry.

The retirement of Professor Morris Loeb at New York University left an attractive vacancy, and Lamb resigned at Harvard and went to New York University in 1906 as Assistant Professor of Chemistry and Director of the Havemeyer Laboratory. He gave courses in physical and electrochemistry and directed the researches of several graduate students on electrode potentials, vapor pressures and solution densities. The latter topic resulted in his oft-quoted paper with R. E. Lee, which dealt with a float method for detecting and measuring small differences in solution density. He also began the study of cobalt and other metal ammines, a subject which held his attention for more than forty years. As director of the laboratory he laid the foundation for his later success at Harvard in the same capacity, and began long-term friendships with Arthur E. Hill, J. E. Zanetti, C. F. Chandler and Marston T. Bogert. He joined the Chemists Club, held offices in the Bronx Society of Arts and Sciences, and revisited Europe several times.

The years 1911 and 1912 brought departmental changes at Harvard: Charles Loring Jackson in organic chemistry retired and Charles Robert Sanger, who taught inorganic chemistry and was Director of the Laboratory, passed away suddenly. The filling of these two places brought to Cambridge Arthur B. Lamb from his brief stay at New York University, and Elmer P. Kohler, who had received the Ph.D. at the Johns Hopkins University and had been for twenty years on the faculty at Bryn Mawr College. The new arrivals were unmarried, became close friends and enjoyed working and occasional vacationing together. They served later as resident proctors in adjoining freshmen dormitories. During this period, too, Lamb became acquainted with many of his fellow chemists in the Boston area, in particular James F. Norris, Arthur A. Noyes, C. S. Hudson and Frederick G. Keyes of the Massachusetts Institute of Technology, as well as Kenneth L. Mark of Simmons College and Walter L. Jennings of Worcester Polytechnic Institute. The latter two were his tennis opponents in brief recreational periods. He renewed and continued his friendship with Arthur Michael, who had retired from active work at Tufts in 1910, and was largely instrumental in persuading Michael to join the Harvard chemistry staff in 1912 as research professor of organic chemistry.

By 1914 Assistant Professor Lamb was fairly well settled on his new work as teacher and laboratory director, but the beginning of World War I caused minor and then ever-increasing disruption in the exchange of scientific information, and troublesome practical complications in the importation of chemicals and scientific apparatus. The War Department, upon the entrance of the United States into the War in 1917, turned to the Harvard department for help. This was due in no small measure to the fact that it was headed by one of America's eminent chemists, T. W. Richards. Lamb's first war work was on a project referred to him by Richards, coming from "Military Intelligence." The study involved chemical testing of captured letters, to develop methods of revealing possible hidden writing. Little of value actually was found, but new methods were studied for producing and developing invisible writing, with Norris F. Hall and Emmett K. Carver as collaborators.

Next, the National Research Council urged a study of the detection and removal of carbon monoxide from air. Lamb had worked with iodine pentoxide during his graduate study at Tufts, and knew that carbon monoxide reacts with iodine pentoxide at moderate temperatures. With the aid of Charles R. Hoover of Wesleyan University, the reaction was investigated with the hope of varying conditions to accelerate the process. Success was achieved with the discovery that a mixture of iodine pentoxide and fuming sulfuric acid, when supported on pumice, reacts readily with carbon monoxide. This catalyst was patented later, and widely used under the name "Hoolamite."

The tempo of the War increased and gas warfare, introduced in 1915, became of critical importance. Hence the War Department established the Chemical Warfare Service, in the form of a Research Division of the U. S. Bureau of Mines, and a group of chemists was gathered at American University in Washington, D. C., to study gas warfare. At the solicitation of James F. Norris and Warren K. Lewis, Lamb received a leave of absence from Harvard in the late summer of 1917 to join this organization. His activities were many: consultations, two or three days a week of travel, supervision of research, and the newly accepted editorship of the *Journal of the American Chemical Society*. It may be wondered now whether the new Editor, reading by midnight oil the review reports of his small staff of ten Associate Editors and accepting a score of new papers per month, had any thought that three decades later there would be an Editorial Board of two dozen members and a monthly acceptance rate of more than two hundred papers. William A. Noyes had initiated the referee report system by mail, and Arthur Lamb developed it by enlisting many reviewers who were not members of the Board.[1]

New laboratories for the Chemical Warfare Service were being constructed, and when completed the Director, Colonel George Burrell, assigned to Lamb the supervision of several sections, which included those on carbon monoxide, charcoal and soda-lime. A little later the Army militarized the organization and Lamb as Lieutenant Colonel was made Chief of the Defense Chemical Research Section. As Chief he continued to practice chemistry, but he became an accomplished executive, persuading professors at universities either to come to Washington or to undertake work at home, discussing war problems with the military, and negotiating with men in industry. In these activities his natural, kindly and approachable manner and disposition were of the greatest value in cementing friendships, and making new ones. After a few months "bottlenecks" developed in the application of research results to industrial or field use, and he persuaded Elmer P. Kohler to take leave from Harvard and serve as coördinator.

In the meantime the interest of the Navy Department in the carbon monoxide problem had been intensified because of the toxicity of the gas in gun turrets and below-decks locations. J. C. W. Frazer at the Johns Hopkins University and C. W. Merrill and C. C. Scalione at the University of California had been engaged in the study of carbon monoxide. The latter two came to Washington and the group was able to perfect a new catalyst, usable in gas masks, which was named "Hopcalite." In coöperation with John H. Yoe a canister and accessories were designed for use with Hopcalite and quantity production of some thousands of the masks was undertaken in a small factory in New Jersey. Lamb was responsible for the solution of the many problems involved in this development; establishing and equipping the factory, then procurement of materials, assembly, testing and inspection. The War ended, however, before the masks could be tested in actual field usage.

Although the Armistice brought rapid demobilization of much of the War Research personnel, Lt. Col. Lamb and some others remained active for several months in order to write historical reports of the various projects and to make recommendations regarding the future activities of the Chemical Warfare Service. The final decision was reached to establish the Research Division as a permanent military unit at the Edgewood Arsenal. Lamb was sought by Maj. Gen. W. L. Sibert as the man who could direct this Division, because of his background of experience in chemistry and his close acquaintance with universities and their staffs. He was promised the rank of Colonel, with advancement to Brigadier General within a year. After pondering the proposal for a time, Lamb declined; he was urged strongly to reconsider, but soon astonished the General by repeating the declination.

The Westinghouse Machine and Electric Company had aided in some aspects of the C.W.S. projects on toxic smoke precipitation. Lamb had become acquainted with Chief Engineer Lamme of the Company, who now invited him to take the position as Director of their research laboratories. Lamb visited Pittsburgh and was really interested, but the prospect of a quiet academic and research life at Harvard overbalanced the attraction of industrial chemical investigations in unfamiliar fields.

Following closely on these two opportunities came another. President Woodrow Wilson had appointed a special committee to study and make recommendations on the future use or disposition of the power plants and nitrogen fixation plants at Muscle Shoals, Alabama. The Committee had decided to establish a research laboratory utilizing the C.W.S. equipment at American University, and to send a mission to study nitrogen fixation plants in the occupied areas of Germany and in other parts of Europe. By request of Arthur A. Noyes, Lamb not only joined the mission but also agreed to accept the post of Director of the newly established laboratory provided that R. C. Tolman and W. C. Bray were appointed Assistant Directors and that salaries in excess of the then current Government scale were approved. With staff and facilities arranged, the mission left in June of 1919. At first the members worked together, then the group scattered on individual assignments, and Lamb returned home as soon as he could find accommodations on a returning troopship.

By September of 1919 Lamb was back in Washington beginning his new work as Director of the Fixed Nitrogen Research Laboratory. Profiting from the results of the foreign inspection trip, the F.N.R.L. perfected the Haber process to such a degree that there was no need to convert and expand the Muscle Shoals installations for commercial production of fertilizers. During this period Director Lamb persuaded those men who had cooperated in the discovery of "Hopcalite" to pool their patents into a "patent trust," which then licensed the patents, collected the royalties and disbursed the income on a prearranged formula. He promoted a similar patent trust for the many patents arising from the F.N.R.L. research work.

By the end of 1920 Lamb was faced with the decision between either remaining in Washington and resigning from the Faculty at Harvard, or of returning to the University. He chose the latter alternative and in September of 1921 was once again active in University teaching and research. He had charge of the elementary chemistry course (Chemistry A), and for more than twenty years met nearly all the lecture periods of the course, as well as visiting laboratory sections from time to time. He devoted much time and thought to his lecture demonstrations, which made clear many an obscure point; they seldom went wrong but one class and the assisting staff will long remember his

(1) *Cf.* his more extensive summary in "A History of the American Chemical Society," 1951, pp. 325–329.

quick perception and ready wit on the occasion when the demonstration assistant inadvertently used butane instead of methane to illustrate hydrocarbon molecular weight relations. He also gave the course in electrochemistry and directed the work of several graduate students in various aspects of gas adsorption, electrochemistry, and in his favorite subject, the cobaltammines. The adsorption and inorganic chemistry investigations represented extensions of his earlier studies of the relations of catalysts and adsorbents to carbon monoxide and other gases. His interest in electrochemistry centered on the electrode potentials of various elements, and led into some commercially useful results in battery manufacture. The studies of cobaltammines dealt mainly with preparations of new compounds of interest, and the study of their transformations and conductance or ionization properties.[2]

To the *Journal of the American Chemical Society* he now was able to devote more attention. Receipts of manuscripts had so increased that his efforts were directed to improved editorial treatment, and to amplifying the editorial board by the addition of skilled referees. Contributors did not always take kindly to the anonymous nature of the reviewers' reports on their writings, as may be shown by quoting the Editor's own words[3]

> ... Two objections were raised to the referee system. One was the delay it might entail as compared with ... a small centrally located board of editors. ... The other objection ... occasionally raised ... was the anonymity of the referees. Some referees felt that it was underhanded to make any unfavorable comment without sending it, or having it sent, over their own signatures to the author. This feeling was based on a misconception of the referee's and editor's function. The editorial appraisal of a manuscript is not a contest between author and editor. The referee is appealed to by the editor as an expert ... for his opinion as to the abstract scientific merits of the manuscript. No personalities are involved ...

For a few years after 1917 Director's Secretary Margaret Buck carried on the Journal secretarial work, but after 1920 it devolved upon Emily L. Clark, a retired teacher with a remarkable classical education (A.B., Ph.D. in Sanskrit, Boston University) but no knowledge of Chemistry. Later she added the Journal proof-reading to her duties and continued the work for over 25 years until her sight failed. The work as managing editor was done by Willis A. Boughton, Assistant Director of the Harvard Chemical Laboratories, until about 1925, when illness forced him to relinquish it to several graduate student assistants.

Harvard's Boylston Hall had been the chemical laboratory since its construction in 1857; Josiah Parsons Cooke in the 1890's had recommended improved quarters but without results. Immediate migration of the Harvard chemists to the growing science campus in quiet surroundings north of the Yard now became Director Lamb's pressing concern, both as to planning and as to financing. He carried on much of the work of design and negotiation with the architects and contractors; he solicited the needed funds from many sources, attested by the names of Mallinckrodt and Converse on the buildings and by the many memorial plaques throughout the halls. Construction was begun early in 1927 and much of Dr. Lamb's working time thereafter was devoted to consultation related to the work. The buildings were in sufficiently complete condition by September of 1928 to permit partial occupancy and an open-house inspection by registrants at the Swampscott meeting of the American Chemical Society. Within a year or two he was engaged in a similar task in the construction of Byerly Hall for Radcliffe College.

Arthur Lamb had very little time for non-professional activities during the first two decades of his career. Recognition came to him: in 1920 Tufts College awarded him an honorary Sc.D. degree, and the National Academy of Sciences chose him for membership in 1923. He became a member of the American Association for the Advancement of Science and was elected to the American Academy of Arts and Sciences.

On December 27 of 1923 he married Blanche Anne Driscoll. Students and friends alike will remember their home in Brookline as the scene of many congenial gatherings. They found time to travel together occasionally, especially since the Council of the American Chemical Society meets at each national convention, and the Editor of the Journal is a Councillor *ex officio*. In 1926 David Becket was born, and Deborah Anne in 1928. Their life, however, was saddened by Mrs. Lamb's frequent illnesses, which led to her death in 1935. The planning and construction of the new laboratories coincided with much of this troubled time, but few of his numerous business, professional and academic conferees ever suspected or knew of the worry and strain under which he lived and worked.

During the first ten years of Arthur Lamb's editorship the Journal expanded largely, from some 200 papers a year to over 700, but the editorial and budgeting problems were not especially critical. With the onset and continuance of the depression period after 1929, the submission of new papers slowly increased in rate, as did the cost of printing, but the membership of the American Chemical Society declined, and hence its income. Under the influence of these factors the ensuing decade witnessed the development and general acceptance of the Referee system, with an added insistence on thoughtful and concise writing of manuscripts. Arthur Lamb was a past master in good writing in every sense of the term, and American chemists never had a better teacher or critic. His own research papers are a pleasure to read; they are masterpieces of descriptive, factual and critical writing.

Some of his best-phrased, most careful and thoughtful writing is recorded in the countless personal letters he addressed to authors of papers which had encountered "referee trouble" and hence were returned with acceptance subject to rewriting, new experimentation, or other improvement, sometimes with a sample outline or a recasting of the whole paper; sometimes the letter was one of kindly encouragement but authoritatively supported declination. Many contributors have illustrations in their files, for example (1925):

(2) A more extensive survey of his scientific contributions has been given by F. G. Keyes, "Biographical Memoir" (Arthur B. Lamb), National Academy of Sciences, Columbia University Press, New York, N. Y., 1954.

(3) Ref. 1, pp. 326–327.

I agree absolutely with you that the rejection of manuscripts merely because they are exclusively theoretical would be a mistaken and indeed absurd policy, and I never have adopted it. It is true . . . that a surprising proportion of *exclusively* theoretical papers is unsuitable for publication. A much more general and valid principle, in my opinion, is to require that theoretical papers present hypotheses and reach conclusions which are susceptible of experimental verification. If they contain no new experimental evidence on the point at issue, they should suggest new ways of obtaining such evidence. In other words, such papers should not be mere speculations where elaborate, unproved assumptions and hypotheses are introduced to obtain agreement with facts already known. There is a great potential supply of such theorizing. Every time a paper is printed which is doubtful from the above point of view, a crop of other and more doubtful manuscripts results. . . . The other two most vexing editorial problems are somewhat the converse of the above. The first is to restrict the publication of non-significant experimental data, or data not susceptible of precise experimental verification by subsequent investigators; the second is to secure a brief, and usually tabular, presentation of the compendious data of the preparative organic chemist. . . . Your manuscript is accepted, but . . . .

Still another medium for his choice of and command of words was the reviewing of books, of which scores came to his desk each year. He believed that book reviewing should be done well, both as a means of praise and encouragement to the author of a good book, or as a rebuke to the maker of a poor one and a warning to the prospective purchaser and reader. He did not approve of perfunctory and passing praise with overlooking of faults, and tried always to enlist reviewers who would accept the responsibility of a competent and impartial review. He read and reviewed more than 200 books in his thirty-two years as Editor, some with high praise, others critically, and his words reflect his background of general information on the many fields of science, and his quick appreciation of an author's purpose and the impact of his work on the reader; for instance, commenting on "Justus von Liebig" by Richard Blunck (1939):

This interesting biography of Liebig is addressed to the general reader rather than to the specialist or chemist. It deals most fully with the years of Liebig's youth and early triumphs, since this period throws most light on his genius and personality. The biographer is frankly sympathetic and appreciative rather than analytical and critical. He can, however, hardly be blamed for his tolerance; Liebig's brilliance, high ideals, passionate devotion to his subject and commanding personality adequately counterbalance his frequent unreasonableness and indeed perversity. His ardent advocacy of a united Germany at the time when his country was weak and divided also must endear him to the German of today.

About half of the articles submitted to the Journal were reviewed by Associate Editors, and the remainder by non-board referees skilled in the particular subject of the paper. The Editor on many occasions acknowledged his continuing debt to these consultants, and to Editorial Secretary Marjorie Ellms, who managed the office from 1933 to 1949.[1] A more serious development from the controversies which arose with certain authors was the losing of antagonized and border-line field contributors. This troubled Editor Lamb and he spoke about the problem frequently in board meetings. He felt that the founding of the *Journal of Chemical Physics* in 1932 and the *Journal of Organic Chemistry* in 1936 were in part, at least, the result of dissatisfaction with his editorial policies. He always agreed, however, that alternative outlets for publication are desirable and necessary.

During this period of intense literary activity the American Chemical Society chose Arthur B. Lamb as its President for the year 1933. To his Harvard co-workers any additional activity seemed an impossibility; he accepted the responsibility with equanimity and gave attention to the Society's organizational and business problems. Beyond the ordinary duties expected of the President, he had to lend the weight of his foresight and judgment on important matters before the Board of Directors. Financial and policy questions had to be decided: the change of membership dues system and the subscription policy of the Society journals, and the page format of the *Journal of the American Chemical Society* and of *Chemical Abstracts*. His Presidential Address "A Century of Progress in Chemistry" given at the Chicago Meeting of that year was well received.[4]

During the late 1930's Lamb actually had more leisure time. He devoted much of it to his children and took short vacations on Cape Cod, in Florida, in the New Hampshire hills, and in the Adirondack mountains (he had been a member of the Alpine Club for years). He served as deacon in the First Unitarian Parish of Brookline, as a member of the Board of Trustees of the Brookline Public Library, and of the Winsor School in Back Bay, Boston. He was a loyal supporter of the Omicron Chapter of Alpha Chi Sigma and was its Faculty Advisor for a number of years. He completed some long-delayed writing, did much consulting, and on occasions served as expert witness in chemical patent litigation. He enjoyed recounting an episode in which his associated counsel came upon him lunching with James F. Norris, the expert witness of the opposition.

In the middle 1930's the Journal receipts of papers were at a lower ebb and then the curve turned upward again. The income of the Society kept pace with the rise, so that pressure for additional space over that provided was not acute. During this period Lamb instituted the custom of a dinner for the Editorial Board at each National Meeting; these gatherings were attended by a majority of the Board, as well as by a few emeritus members, society officers and sometimes a visiting foreign chemist. The ensuing discussion dealt with matters of major and minor importance, the team spirit of the group was stimulated and new members were initiated into the problems of the Journal.

Publication of chemical research in the United States again was increasing rapidly when the beginnings of the second great war caused a redirection of scientific effort. The immediate effect was a diminution in the supply of publishable material, owing to the diversion of personnel into classified research, lack of time for war-busy chemists to prepare previously completed work for publication, and the effects of censorship. The daily volume of Journal business decreased after 1941, but Editor Lamb was more busy than ever, with important war research at Harvard and many con-

(4) A. B. Lamb, *Science*, **78**, 371 (1933).

sultations elsewhere. Although past sixty years of age, he travelled as many miles per month as men of half his years, and he served as consultant for many companies and on numerous projects. He was honored by special citations for his war services.

Even before hostilities began, Lamb and the Editorial Board of the Journal were aware of the significant problems being studied in secrecy, and took steps to withhold certain important papers in these fields, submitted by authors who did not realize their strategic value. Actual O.W.I. censorship came early in 1942, forbidding "export" of papers on certain topics. A score of relatively harmless articles were temporarily delayed in publication, but by 1943 a procedure was developed with the aid of Secretary Parsons' office to clear nearly all papers with a minimum of delay. The Journal also was hampered in its publication by War Production Board restrictions on allocation of zinc and copper for plates and of paper stocks, applied impartially to *all* periodicals.

Arthur B. Lamb was promoted to Professor in 1920, Sheldon Emery Professor in 1925 and Erving Professor in 1929, and 1940 he was made Dean of the Graduate School of Arts and Sciences. He held this latter office for several years until for reasons of health he was forced to withdraw from some of his many activities. The New York Section of the American Chemical Society awarded him the William H. Nichols Medal in 1943,[5] and Tufts College in June, 1944, honored him with the Hosea Ballou Medal for distinguished service. He retired from the Directorship of the Harvard Chemical Laboratory in 1946 and from undergraduate teaching two years later. The University allowed him to retain his office and laboratory suite for Journal work and several continuing research problems.

The American Chemical Society presented him with its highest honor, the Priestley Medal, at the 116th Meeting in Atlantic City in September of 1949, on which occasion he made an address "Publications—Lifeblood of Science," and said[6]

> . . . Having now demonstrated, I trust, the benefits that mankind can derive from the progress of science, it is even more evident that the *publication of research is essential to such progress.* Science progresses by the joint efforts of many workers, each building on the achievements of his predecessors. New discoveries, when published, can shed new light on thousands of unsolved problems. . . . The first aim of our Society since its very founding has been the publication of chemical research. Let us not be diverted from this important and inspiring undertaking. Instead, let us redouble our efforts. . . .

(5) *Chem. Eng. News*, **21**, 365 (1943).
(6) *Ibid.*, **27**, 2841 (1949).

This last sentence summed up what had been transpiring in the Journal office since the end of the War: space again was at a premium, graduate schools were manned once more, and much war work was being declassified. In the midst of all this activity the veteran Editor, now 69, tendered his resignation to the Directors, served as a member of the committee to choose a new editor, and smoothed the transition by continuing on the Board as Consulting Editor. The January, 1950, issue of the Journal, with testimonial statement and his portrait, and consisting entirely of papers by former Harvard chemists and Board members, was planned and carried through without his knowledge, and came as a most delightful surprise to him.

His services, however, were still sought by the Society. He was requested to write the "History of the Journal" for inclusion in the Diamond Jubilee Volume history of the American Chemical Society, and to act as Chairman of the Committee on Arrangements for the Meeting of the International Union of Pure and Applied Chemistry, which followed the 75th Anniversary Meeting of the American Chemical Society in New York in September of 1951. During the same year the Chemical Society of London elected him an Honorary Fellow, and the Dayton Section of the American Chemical Society presented him with the Austin M. Patterson Award, in May, 1951. The week-long sessions of the Society and of the Union, in which he participated so vigorously and happily, were his last really public appearances. After a quiet fall and winter of reduced activity, he returned to his Harvard office in the spring of 1952 with enthusiasm, to clear up unfinished work and attend to new matters. The writer discussed Journal affairs with him by telephone early in the afternoon of May 15; three hours later he was gone.

As teacher, research director, editor, consultant and citizen, his services extended over half a century. By decades Arthur B. Lamb spent the first serving his apprenticeship as teacher and executive, and much of the second in the service of his country as scientist and coördinator of men. The third and fourth decades were devoted largely to his adopted University and to his professional Society. Then, instead of retiring quietly, he spent the fifth decade serving all of them: as teacher, researcher, consultant, editor, administrator and friend, in the interests of his university, society, country and fellow men. His personality and teaching reached and permeated all of chemistry, and his contributions to and influence on chemistry will long outlive all of us who knew, admired and loved him.

ALLEN D. BLISS

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A total of twenty-nine patents issued between 1919 and 1932.