

THE NUCLEUS

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Northeastern Section of the American Chemical Society
with the coopération of
The Connecticut Valley Section
and
The Rhode Island Section

VOL. I

MARCH, 1924

No. 2



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American Chemical Society
at Washington, D. C.,
April 21-26, 1924

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Official Notices of the Next Meetings
on Page 3

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NEXT MEETINGS OF THE SECTIONS

The Northeastern Section

The one hundred and ninety-second meeting

Friday, March 14, 1924, 8:00 p.m.

at the Wedgewood Restaurant, 531 Washington St.

Address by Professor Charles James of the University of New Hampshire,
on "Zirconium and Allied Elements."

Dinner will be served at 6:30 p.m. at the Wedgewood Restaurant for those who make reservation by returning the enclosed card by March 12. Dinner, \$1.25 per plate. Meeting of the Executive Committee and Council in Dr. Esselen's office, 276 Stuart St., at 5:00 o'clock.

The Connecticut Valley Section

Next meeting Saturday, March 15.

in the new Elihu Burritt Hotel, New Britain, Connecticut.

Address by Dr. C. J. Fink of Columbia University.

The Rhode Island Section

Joint meeting with the Steel Treathers,

Wednesday, March 26, 8:15 p.m.

at the rooms of the Providence Engineering Society.

Address by General T. C. Dickson, Commanding Officer,
Watertown Arsenal, on "X-Ray Study of Metals." (Illustrated.)

There will be an informal dinner preceding the meeting.

Further details of coming meetings are given in the News of the Sections, pages 10-12.

New Members. The Council of the American Chemical Society has voted that a part of the first year's dues for all new members obtained through a local section be given to that section for its local expenditures. Anyone who obtains new members for the Society should, therefore, send the application blanks to his local secretary (see pages 10-12) and not directly to C. L. Parsons as in the past.

THE FOUNDERS OF CHEMISTRY IN AMERICA**Lyman C. Newell, Ph.D.***

Abstract of a paper read Friday evening, February 8, 1924, at the one hundred and ninety-first meeting of the Northeastern Section of the American Chemical Society.

The foundations of chemistry in America were laid between 1775 and 1875. Progress was stimulated at first by Medical Schools and by scientific societies, e. g., the American Philosophical Society (1743—still active), the Chemical Society of Philadelphia (1792—about 1809), and the American Academy of Arts and Sciences (1782—still active).

James Woodhouse. Chemistry was taught in the Philadelphia Medical School by Benjamin Rush as early as 1769. In 1794, soon after his arrival in America, Joseph Priestley was offered this position but declined. James Woodhouse was appointed and held the place till his death in 1809. He was the first to lay broad foundations, being a teacher, author, investigator, and organizer. He wrote the first American laboratory manual—the “Young Chemists’ Pocket Companion” (1797). Two of his students became famous—Robert Hare and Benjamin Silliman. In 1802, Woodhouse visited Europe, brought back an electric battery, and performed striking experiments with it. Woodhouse repeated Davy’s experiments with nitrous oxide, studied the action of nitric acid on metals, analyzed many rocks, minerals, and ores, investigated the ways in which plants purify air, conducted a long series of experiments on the chemistry of flour and baking, devised a process for making fulminates, obtained potassium by heating soot and pearlsh, and showed the superiority of anthracite coal over soft coal.

John Maclean was chosen Professor of Chemistry and Natural History in Princeton University in 1795. For ten or twelve years he gave lectures without a textbook but in 1808 adopted Henry’s “Epitome of Chemistry” (edited with notes, by Benjamin Silliman).

Priestley and Phlogiston. In 1796 Woodhouse, Maclean, Mitchill (of New York), and Adet, a French chemist of Philadelphia, became involved in a controversy with Priestley about the theory of phlogiston. Papers and replies were published for several years in the Medical Repository which was founded by Mitchill in 1797. Mitchill endeavored to

* Professor Newell is the Head of the Department of Chemistry of Boston University and the Secretary of the Section of History of Chemistry of the American Chemical Society. (Ed.)

THE NUCLEUS

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Vol. I

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No. 2

A CABLE FOR CRITICS

Two issues do not make a habit. The NUCLEUS is not yet a slave to settled customs or established formulas—and we hope it never will be. It started life furnished forth by the limited wisdom of the Board of Editors. In spite of many kind comments, it must, we know, have the imperfections of a new venture. All the members of all the coöperating sections are, therefore, invited, yea, implored to assist in making this bulletin as interesting and useful as twelve hundred-odd brain power can do.

Please transmit your criticisms and suggestions and contributions to any member of the Editorial Board, preferably in writing to ensure more careful consideration. Brick-bats, it should be emphasized, are more useful than bouquets, even if they are less pleasant to receive. Frank fault-finding helps more than platitudinous praise. Most of us improve according to our ability to assimilate censure, like the vaudeville actor who raised a healthy family on the supply of vegetables donated to him—across the foot-lights.

If, as we hope, fifty-seven varieties of advice and complaint come in, it may be difficult to act upon them all at the same time. But suggestions will always be welcomed, and will be applied in practise as fast as we can use them for improving the bulletin.

reconcile the disputants by interpreting the results of each party, but to no avail. Priestley resented Mitchill's friendly interposition, and finally published a pamphlet—the last scientific article he wrote—entitled "The Doctrine of Phlogiston Established and that of the Composition of Water Refuted." Priestley was not convinced of his error, but the early founders of chemistry in America, especially Woodhouse, Maclean, and Mitchill, as well as Robert Harè and Benjamin Silliman, who had discreetly enjoyed the controversy from a distance, moved on with more confidence in a pathway which led them to enduring discoveries.

Samuel L. Mitchill was appointed professor of chemistry, natural history, and philosophy, in King's College, afterward Columbia College, in 1792. He was the first American to adopt and teach the French chemistry, and in 1794 he published an essay on the nomenclature of the new chemistry, entitled "A Synopsis of Chemical Nomenclature and Arrangement." He was a teacher of power and ability, supplementing his lectures by experiments and by specimens, especially minerals, from a chemical museum he had recently established. As a chemist Mitchill made contributions to the recurring problem of gunpowder, to soap making, to the use of certain chlorides as disinfectants, and to the disconcerting action of nitric acid on silver, copper, and tin. He published articles on the history of muriate of soda, on the rendering of ocean water fit for washing without the aid of soap, and on the salts in the Saratoga Springs water.

College Teachers of about 1800. About 1800 chemistry in America was beginning to be recognized. This was due to several facts. One was the simultaneous advent of two remarkable men—Robert Hare and Benjamin Silliman. Hare lived and worked in Philadelphia for about 70 years. He was Professor of Chemistry in the University of Pennsylvania for 30 years. Silliman lived and worked in New Haven about 70 years, 50 years being spent as Professor of Chemistry in Yale University. They began to study chemistry together as youths of the same age in Philadelphia in 1802, and continued their intimacy through their lives. Another fact was the establishment or extension of chemistry in institutions which have maintained unbroken instruction to the present day. At Harvard, Aaron Dexter began to teach chemistry in 1782 and finally secured an endowment for the Erving Professorship of Chemistry. At Dartmouth, Nathan Smith started a medical school in 1798. At Bowdoin, Parker Cleaveland gave the first lectures in chemistry in 1808, and continued for over 50 years. Instruction in chemistry as a specific subject began in Columbia in 1802 and in Yale in 1804.

Robert Hare was born in Philadelphia in 1781 and died there in 1858. He sent a communication in 1801 to the Chemical Society of Philadelphia, describing the discovery of the hydrostatic blowpipe, later called the compound or oxyhydrogen blowpipe. He invented in 1816 a powerful galvanic battery called the calorimotor and in 1820 another called a deflagrator. Hare also devised an apparatus which was probably the first electric furnace ever used. With this, or a similar furnace, he obtained calcium carbide, phosphorus, graphite and calcium. In 1818 he was elected Professor of Chemistry in the University of Pennsylvania where he remained until 1847. The American Academy of Arts and Sciences bestowed the first Rumford Medal upon him in 1839. He contributed over 200 articles to Silliman's American Journal of Science.

Benjamin Silliman was born in North Stratford, Connecticut, in 1779, and died in New Haven in 1864. In 1802 he was appointed Professor of Chemistry and Natural History in Yale University. Never having studied chemistry, he obtained a list of books from John Maclean of Princeton; but his private reading was not fruitful. Hence during the winters of 1802-3 and 1803-4 he attended the lectures of James Woodhouse, though he learned more by studying with Robert Hare. In 1805, he took private lessons of Friedrich Accum in London. Upon returning to Yale, he resumed his teaching and continued until 1853. While in Philadelphia Silliman and Hare boarded at the same place. Silliman says: "We made use of a spare cellar kitchen in which we worked together in our hours of leisure from other pursuits. Mr. Hare had, one year before, perfected his beautiful invention of the oxyhydrogen blowpipe. . . . His (Hare's) original experiments were repeated in 1802-3 in the presence of Priestley. . . . Silliman, Woodhouse, and others. They were subsequently extended by Silliman, who. . . subjected a great number of refractory bodies to the action of the oxyhydrogen jet."

Silliman started the American Journal of Science in 1818. For years he patiently edited the Journal and paid the annual deficit without complaint, and throughout most of his life kept it going. Many well-known chemists helped him in the middle eighteen-hundreds, e. g., his son (Benjamin Silliman, Jr.), Joseph P. Cooke, Jr., and Wolcott Gibbs. It is still published.

Silliman began his popular lectures early in his career. He had rare qualifications for this work. His lectures were thronged by intelligent and cultured audiences. In 1835 he lectured on geology in Boston. In 1839-40 he came to Boston to open the Lowell Institute. He gave several courses on chemistry at the Institute.

Professor Storer left the Institute in 1870 to become Professor of Agriculture at the Bussey Institution, a recently organized School of Agriculture and Horticulture.

The American Chemical Society. On Aug. 1, 1874, American chemists gathered at the old home of Priestley in Northumberland, Pennsylvania, to celebrate the centennial of the discovery of oxygen. One outcome of this meeting was the founding of the American Chemical Society in 1876.

NEWS OF THE SECTIONS

The Northeastern Section

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February meeting. After the usual dinner (or did it seem *unusually good?*), at the Wedgewood Restaurant, the Section listened to the very informing address, of which a brief abstract forms the main article of this issue. Professor Newell showed many slides of portraits of earlier American chemists as well as of pictures of apparatus and of publications. After the lecture the members lingered long about the table on which were exhibited Professor Newell's valuable collection of prints, books, letters and other documents of the early period of chemistry in this country.

The Leap Year Party is prophecy when the NUCLEUS goes to press, and history when it is read. From the prophetic angle it is not possible to say whether the affair is after the Atlantic Monthly standard or the Police Gazette model. Perhaps it is a mixture. Here's hoping the Descent to Levity will prove so delightful that it will become an annual habit of the Section.

March meeting. The Section recalls with pleasure the welcome Professor James gave its members when they traveled through a pouring rain to Durham two or three years ago for the annual picnic. We remember his unique collection of the rare earths which he had arranged for our inspection. Professor James is returning our call, March 14, when he speaks to us at our regular meeting on "Zirconium and Allied Elements." He is undoubtedly the leading authority in the country on the rare earths. He was born in England, but has been at New Hampshire State College since 1906. In 1911 he received the Nichols Medal from the Society.

Silliman took promising young men into his laboratory as private pupils and assistants. One of these was Oliver P. Hubbard, who went to Dartmouth in 1856, where he taught chemistry for nearly 50 years. He also stimulated a dormant interest in chemistry in young men by his popular lectures and experiments. One of the lads so aroused was Josiah P. Cooke, Jr.

Early chemistry at Harvard University. At Harvard University, Aaron Dexter (1750–1829) was Professor of Chemistry and Materia Medica in the Medical School from 1783 to 1816. John Gorham (1783–1829) succeeded Aaron Dexter and was Erving Professor of Chemistry from 1816 to 1827. In 1827, John W. Webster was made Professor of Chemistry and Mineralogy, a position which he held until 1849—a short time before his death. Professor Webster confined his instruction to the Medical School, except toward the end of his term of service. Then he gave two or three chemical lectures to the undergraduates of the College “which were brought to a sudden end by his show experiment called the volcano.” This was the position of Chemistry in Harvard University up to the time just preceding 1850.

Josiah P. Cooke. Josiah P. Cooke was a member of Professor Webster’s “Volcano class”—in which he learned no chemistry. He graduated from Harvard University in 1848 and returned after a year’s study in Europe. In ten years, despite opposition, Professor Cooke introduced chemistry into Harvard College, built up courses, and erected and equipped a building for lectures and laboratory work, the present Boylston Hall. Among his first laboratory assistants were Frank H. Storer and Charles W. Eliot.

Charles W. Eliot and Frank H. Storer. Mr. Eliot continued to study at Harvard and took his A.M. in 1856. He studied with Professor Cooke up to 1858, and remained at the College, an Assistant Professor, up to 1863. He studied chemistry in Europe from 1863–65. Mr. Storer received his B.S. from the Lawrence Scientific School in 1855. From 1855–57 he studied chemistry in Europe. When the Massachusetts Institute of Technology opened in 1856, Storer and Eliot were among its professors. The laboratory was a small poorly equipped room in the second story of a mercantile building on Summer Street, nearly opposite the store of C. F. Hovey and Company. There were no suitable laboratory manuals in chemistry available, so they wrote one in general chemistry and another in qualitative analysis, which set the standard for other institutions. Professor Eliot resigned in 1869 to become President of Harvard College, and

The Speakers' Committee, which has been at work for some months, is now ready to furnish speakers for meetings of clubs and other organizations. For the subjects of these addresses and other information, apply to J. A. Seaverns, Chairman of the Committee, 99 Broad Street, Boston.

The Massachusetts Committee on the Prize Essay Contest is made up of the following members: F. W. Hobbs, President of the Arlington Mills, Chairman, Dr. L. A. Pratt, H. J. Skinner, Prof. J. F. Norris, Prof. W. L. Jennings, Dr. Reid Hunt, Dr. D. L. Edsall, Dr. S. J. Mixter, R. W. Neff, S. W. Wilder, Dr. Alice Hamilton, Pres. Mary M. Wooley of Mount Holyoke College, Pres. K. L. Butterfield of the Mass. Agricultural College, G. H. Ellis, Henry Black, S. W. Hoyt, J. E. King and F. B. Sibley. The Executive Committee consists of F. W. Hobbs, J. F. Norris, H. J. Skinner, S. W. Wilder and R. W. Neff, Secretary, 22 India Square, Boston.

The Connecticut Valley Section

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The February meeting opened with a trip through the South Meadow Station of the Hartford Electric Light Co. The mercury boiler installation was shut down for inspection and cleaning, and the Section, consequently, was unable to see it.

After dinner and a short business meeting, Professor H. A. Curtis of Yale University spoke on "The Fertilizer Industry of the World," discussing the sources and production of fertilizer materials, their cost, and their influence on agriculture, and the production of high-analysis fertilizers. The Section enjoyed the talk, and the discussion about the Government nitrogen fixation plants.

On account of the joint New England meeting no January meeting of the section was held. The following local members were among those present at the joint meeting: L. B. Allyn, R. A. Beebe, J. E. Cavelti, J. S. Chamberlain, R. R. Denslow, G. A. Hill, C. R. Hoover, V. K. Kriebel, A. R. Lincoln, H. G. Mickelson, C. A. Peters, Paul Serex, Jr.

All who attended feel that the joint meeting was an unqualified success and hope that the arrangement will be continued.

The section welcomes several new members, either active or associate.

Dr. Jone E. Fogelson comes to Trinity College as assistant professor from Sewanee College. He was formerly connected with the Barrett Company and was a graduate student at Cornell.

Dr. R. A. Beebe takes the place of Dr. Geo. Scatchard at Amherst College. He has completed several years of graduate work at Princeton University and is the joint author with H. S. Taylor of an article in the January Journal.

Other New Members

A. Q. Butler, Wesleyan University, Middletown, Conn.

Miss Jessie Conn, 103 South St., Northampton, Mass.

J. D. Case, 23 Harvard St., Hartford, Conn.

Gilbert Seil, Box 489, Meriden, Conn.

The Rhode Island Section**OFFICERS**

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Meetings

In general, the fourth Friday of each month, at the rooms of the Providence Engineering Society, 44 Washington Street, Providence, at 8:15 P.M. An informal dinner usually precedes the meetings. Notify Miss C. R. Crosby, Brown University, if you can attend, and come if possible, to greet and become acquainted with our speakers.

The **March** meeting will be held Wednesday, March 26th, at 44 Washington Street, at 8:15 P.M. This will be a joint meeting with the Steel Treathers. Speaker—General T. C. Dickson, Commanding Officer, Watertown Arsenal. Topic—"X-Ray Study of Metals." The usual informal dinner will precede the meeting. General Dickson is a West Point graduate and a regular army officer. He is much interested in research, especially along the lines of the determination of the internal structure of various types of steel. The talk will deal with the application of a high voltage Coolidge X-ray tube to the study of the chemical structure of compounds existing within the different kinds of steel, as well as to the discovery of hidden flaws. Methods of design of steel castings can be improved materially, and less metal used when the information so obtained is at hand. General Dickson is a good speaker, and has been enthusiastically received in Providence before. His talk will be illustrated with slides.

The **January** meeting was held on the 25th, at 44 Washington Street. Dr. Grinnell Jones of Harvard University spoke upon the subject—"The Work of the U. S. Tariff Commission with Especial Reference to Chemicals."

Dr. Jones told us much about the amazing complexity of our modern tariff legislation. The uninitiated can have only a slight idea of the tremendous number of uses for each and every article of commerce which comes into the country. The speaker stressed the inter-relation of industries of apparently the most divergent kinds, and made clear to us the magnitude of the task devolving upon the Commission. This consisted largely in collecting and tabulating the mass of information necessary for the framing of even approximately just legislation. As an example of the unexpected, the following incident was related.

During the war, ships were diverted from Asiatic trade routes cutting off the supply of human hair from China, chiefly used for making hair nets, which were deemed unessential. The result was an immediate uproar in the munitions industry, where

the hair was used in the felt which went into certain shells. Who would have thought it?

The audience departed much enlightened as to the difficulties of running our Government wisely and well.

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