A Brief History of the Chemistry Department – Part I
(excerpts from the Michael Building Rededication Address by Professor David Walt)

The official record of Tufts College for the year 1855 shows that John Marshall, a graduate of Yale, was appointed professor of Mathematics and Physics by the college trustees. John Marshall was the first professor at the University and was also professor of Chemistry. The records also show that he was professor of Mathematics and Physics until 1865 when he was relieved of responsibilities in these two college departments and acquired three others: Mineralogy, Geology, and Chemistry. He held the professorship of Geology and Mineralogy until 1898. From 1892-98 he was dean of the Art School and in 1876 at his own request, the college trustees relieved him of his professorship in Chemistry. The following year Steven Pittman was appointed as professor. Professor Pittman held this position until 1882, when he resigned to enter the insurance field. It was not until 1882 when trustees of the college appointed Arthur Michael professor of Chemistry that the present Chemistry Department, (originally called the Chemical Department) really had its beginnings. The Chemical Department was then located on the first floor of Ballou.

Arthur Lamb, a renowned Harvard professor, wrote in the Journal of the American Chemical Society: "Indeed, chemistry has had a notable history at Tufts. Professor Michael, the most brilliant organic chemist that America has produced, came to Tufts in the 1880's."

continued on next page
A second paper was published contemporaneously with the German paper in the *American Chemical Society Journal*. These events occurred when Tufts was called Tufts College, and located in College Hill, Massachusetts, predating when Tufts was part of Medford.

In Ballou, the student laboratory was in the southwest corner of the building, and included most of the space now occupied by the offices of the deans and the registrar. In 1889 Dr. Frank Durkee, who was one of Professor Michael's first students, was appointed instructor of Chemistry, Gymnasium, and Natural History. In 1895, he was promoted to professor of Chemistry, where he remained until his retirement in 1939. The 76 papers published between 1882 and 1890 in the leading chemical journals of Germany and America demonstrate how busy and occupied these laboratories were. On the other hand, the courses of study were very meager, consisting even up to the college year of 1890-91 of about five subjects: General Inorganic Chemistry, two courses in Qualitative Analysis, each a half-year, one course in Quantitative Analysis of one year, and Organic Chemistry, one half-year. It is interesting to note that in the year 1890-91 there were 26 students in General Chemistry, 22 in the first half of Qualitative Analysis, nine in the second half, and no students taking Quantitative Analysis or Organic Chemistry. The faculty consisted of one professor and one instructor.

This situation inspired Mr. Newton Talbot, (of Talbot Avenue fame), able Boston businessman and treasurer of the college, to house the Chemical Department in a wooden building. Professor Michael was absent at the time and the design of the building fell upon the instructor in residence. A workman of the college farm, who was not a stonemason, laid the foundation. The superintendent of Grounds and Buildings, a carpenter, arranged the construction work. Every man from the college farm who could drive a nail joined the working crew. The laboratory started in July 1895 and was finished and occupied the first of October in the same year. It was located under the Hill by the railroad track, was 100 feet long, 50 feet wide and sheltered one floor and a basement. The cost in round numbers was $1,700. Perhaps it was a record-breaking achievement in low-cost construction of college laboratories. With the addition of plumbing and gas heat, the cost was a few dollars more than $7,000. In the college year 1895-96, the course leading to the B.S. degree in Chemistry was offered, and the course leading to the B.S. degree in Chemical Engineering in the college year 1898-99. From 1895 to 1910, 75 important papers were published, mostly in Germany, making Tufts College Chemical Department better known among German-speaking than among English-speaking countries.

In the meantime, some of the largest industrial concerns of the U.S., Canada, Mexico, and Brazil used the Chemical Department for consulting and research purposes. By 1915, 25 percent of all the students enrolled in Arts, Engineering, and Divinity Schools together with students in Jackson College were working for the B.S. degree in Chemistry or the B.S. in Chemical Engineering. The Chemical Graduates had no difficulty in securing desirable positions, a situation which further stimulated student enrollment, until the Chemical Department, of necessity, overflowed into the attic of Bromfield-Pearson, the basement of Curtis Hall, and the space at that time occupied by the cafeteria. These events made it clear to the trustees and the administration and also to friends of the college that a new and more commodious chemical laboratory must be provided. A committee was appointed to raise funds but met with little success. This was during the first World War, and because times were tight, only $10,000 was pledged. It was not until Dr. Cousens became president of the college, that the necessary funds were secured to build Pearson Hall.

Next: Pearson Hall and the department's expansion.
Instrumentation

The elucidation of the three dimensional structure of molecules remains one of the great challenges in chemistry. For many years, X-ray crystallography has been the only technique providing high resolution structures of complex molecules. Over the last fifteen years, two-dimensional nuclear magnetic resonance (NMR) spectroscopy and molecular dynamics calculations have been developed as a viable alternative to this traditional technique. With NMR-based techniques, molecules can be studied in solution, eliminating the need for crystallization that often complicates X-ray studies on biomolecules.

One-dimensional NMR spectroscopy has a strong tradition at Tufts. The first 60 MHz spectrometer was commissioned in 1963 and the first publication to include NMR data appeared soon after that date. More detailed studies on NMR phenomena followed.

Since biomedical chemistry is one of the developing foci in the department, recent studies have used two-dimensional NMR experiments and molecular dynamics. One of the first solution structures under investigation with this approach is shown above. This structure of a dimethylene sulfone-linked ribonucleotide is unusual in its hydrogen bonding pattern. Nucleobase to backbone hydrogen bonds that are not found in any of the known structures of natural RNA are observed. This observation helps to explain the unusual recognition properties of RNA bearing the CH3SOCH3 backbone substitution. The results also suggest roles for phosphodiester in natural RNA and DNA beyond their function in retaining genetic material within cell membranes. To solve the three-dimensional structure, special protocols for symmetrical complexes had to be used.

As recent advances in NMR and computational technology enable this kind of analysis of large, biologically-significant molecules, the Tufts Chemistry Department must keep moving to meet the challenge and opportunity that these advances offer. We are planning significant NMR instrument improvements and acquisitions to allow high-level structure determinations.

Clemens Richert

Chair's Corner, continued from p. 1

With the generous support of alumni and friends we have begun a major renovation of the physical environment which houses the Chemistry Department. The Michael Research Building has been fully refurbished providing an outstanding research facility including the W.M. Keck Foundation Materials Chemistry Laboratory and the John A. Krol Environmental Laboratories. The west wing of the Pearson Building has also received major renovation including a new laboratory for the physical chemistry classes and a new eighty-seat lecture hall soon to be fully equipped with state-of-the-art electronic teaching equipment.

As we look toward the future, we are not complacent. We must continue the progress made during the Walt years. We must complete the renovation of the remaining physical structure, including the organic and analytical chemistry teaching laboratories. We must further strengthen the teaching and research of our focus areas of environmental, biomedical and materials chemistry by further refining the curriculum and by attracting the best young talent in these areas to our faculty. With our faculty, students, staff, alumni, and friends working together, we can achieve our vision of Tufts Chemistry as a place where the great opportunities of a research university and the special character of a small teaching college meet.

Seminars

Seminars in the Chemistry Department at Tufts have become increasingly attractive. At the beginning of the Fall 1996 Series, the newly renovated lecture hall, Pearson 106, became available for the presentations. Speakers and audience enjoy a very elegant and modern setting. Soon, state-of-the-art audio-visual equipment will be installed, making our seminar room not only one of the most inviting but also one of the best equipped lecture halls on campus.

This distinct improvement in the facility, brought about by completion of renovation phase 1B, is fully matched by a number of exciting presentations. Speakers from all fields of modern chemistry coming from well known national and international research institutions presented their research this year. Several of the speakers are leaders in their field. The names of internationally famous researchers can be found side by side with those of young promising scientists.

In the fall of 1995, the Chemistry Department began a tradition of inviting an exceptionally promising young scientist from the area to give the opening lecture. This somewhat unorthodox initiative has been a great success. After two talks by chemists from Harvard (B. Peterson and L. Isaacs, fall 1995 and spring 1996), Professor Morgan Conn reported last fall on his work performed at the M.I.T., U.C./Berkeley, and Amherst College. Peter Belshaw, who did his doctoral work with Professor Stuart Schraiber, gave the Spring 1997 opening seminar titled "Controlling cellular events with chemical inducers of dimerization." The Spring 1997 Series included presentations by Professor JoAnna Stubbe (M.I.T.) on February 25, by Professor John Wright, who gave the Eddy Lecture on March 11, and by Professor Reza Ghadiri (Scrivps) on May 13, 1997.

The Chemistry Department is looking forward to welcoming additional listeners from outside the department. The seminars are an opportunity for alumni who happen to be in the area to spend an informative and pleasant hour sitting next to Tufts' youngest generation of chemists. The seminars are held at 4:30 p.m. in Pearson 106 unless otherwise noted. Refreshments are served 30 minutes prior to the seminars in Pearson 102.
November 12  Prof. Vassili Karanassios, University of Waterloo  
Elemental Micro-Analysis by ICP Spectrometry

December 10  Prof. Adam Heller  
University of Texas at Austin  
Electrical "Wiring" of Enzyme Reaction Centers to Electrodos through Electron Conducting Hydrogels

Spring 1997 Seminar Series

January 14  Dr. Peter Belshaw  
Harvard University  
Controlling Cellular Events with Chemical Inducers of Dimerization

January 21  Prof. Amy Mullin  
Boston University  
Collisional Quenching of Highly Excited Molecules: Toward a State-Resolved Picture of Energy Dependence

January 28  Dr. Alex Margolin  
Alta Biologics  
Cross-linked Protein Crystals as New Catalysts and Materials

February 4  Prof. Michael Haley  
University of Oregon  
Eugene  
Dehydrobenzoazulenones Revisited: A New Look for a Classic Molecular System

February 25  Prof. JoAnne Stubbe  
M.I.T.  
Bleomycins: Structure and Function

March 4  Prof. Vincent Rotello  
University of Massachusetts Amherst  
Modulation of Cofactor Redox Potentials through Specific Interactions: Synthetic Models of the Flavinenzymes.

March 11  Prof. John Wright  
University of Wisconsin Madison  
Eddy Lecture

Is there Credible Evidence that Active Learning Works?

March 12  Prof. John Wright  
University of Wisconsin Madison  
Research Opportunities at High Laser Intensities – New Optical Materials Based on Fullerenes and New Spectroscopies Based on Multiresonant Vibrational Transitions

March 25  Prof. David Kaplan  
Tufts University  
Spider Silk – A New Paradigm for Materials Science

April 1  Dr. Katharine Gibson  
DuPont  
Mechanism of Dithiobisoin Synthetase

April 8  Prof. Dennis Jacobs  
University of Notre Dame  
Reactive Scattering of State-Selected Molecular Ions on Surfaces

May 13  Prof. Reza Ghadiri  
The Scripps Research Institute  
Molecular Replication

A second interesting and popular series of presentations is held on Thursday afternoons at 4:30 p.m. in Pearson 106. Second year graduate students present their public study topics. This past fall and spring, the following young scientists gave their talks:

September 12  David Turner  
September 19  Rosemary Feeney  
October 3  Jane Pepper  
October 10  Daniell Simonelli  
October 24  Colleen Bleczinski  
October 31  Laura Taylor  
November 14  Jane Ferguson  
November 21  Vladimir Tarasov  
December 5  Charles Tetzlaff  
January 23  Ludo Juurlink  
February 13  John Birtles  
April 24  Christa Bock

You can find information on the departmental seminar series and many other departmental activities on the Tufts Chemistry page on the World Wide Web (http://www.tufts.edu/department/chemistry/seminars.html).

For the most current information, please contact the Chemistry Department Office, Tel. (617) 627-3441, FAX (617) 627 3443. Janice Silva and her team will be happy to place your name on the mailing list for the seminar announcements. All seminars are public and guests are always welcome.
Faculty Profile:

David R. Walt

Professor David Walt joined the Chemistry Department at Tufts University in 1981. He held the chairmanship from 1989 to 1996 and is currently completing a one year sabbatical leave. After receiving a Bachelor of Science degree from the University of Michigan in 1974, he completed graduate studies in Organic Chemistry and Pharmacology at SUNY at Stony Brook in 1979 and did postdoctoral work at M.I.T.

During his tenure as chairman, Dr. Walt has made significant contributions to the Chemistry Department and to the overall standing of Tufts University as a highly regarded educational institution. Under his direction, facilities have been dramatically improved. As a result, teaching laboratories in several courses are now an enhancement to the learning environment and contain state-of-the-art equipment.

Under his leadership, recruitment efforts to hire new faculty have resulted in the addition of new faculty members with exceptional teaching abilities. The momentum gained by these efforts will continue to drive the department toward teaching excellence well into the future.

The research facilities have also been upgraded and renovated. Dr. Walt has been committed to building a strong research atmosphere. Funding, in general, has increased significantly and all faculty are now receiving funding from external sources such as the National Institutes of Health, the National Science Foundation, the Departments of Energy and Defense, and the Environmental Protection Agency.

Curriculum in the Chemistry Department has been expanded in response to the changing needs of the students. Chem 50, a one-semester survey course of Organic Chemistry developed by Dr. Walt, was directed toward students majoring in Biology, Chemical Engineering, and Environmental Studies. An additional course, Chem 156, Biochemistry, was developed in a collaborative effort to provide students with a chemical perspective on Biochemistry. The standard approach had been to teach the course with a metabolic pathway orientation.

Dr. Walt and his research group have several areas of interest. As an organic chemist the focus of all his research is on polymer, materials, surface, and dye chemistry. For the past ten years he has been working on the development of fiber-optic chemical sensors with an overall goal of developing new sensing schemes for clinical, environmental, and process control applications. Sensors which measure continuously the concentration changes in various components of biological and environmental samples have been successfully designed. Some examples include organic vapor sensors for groundwater monitoring and pH sensors for blood monitoring.

His group is currently engaged in a collaborative effort with Dr. John Kauer of the Neuroscience Department at Tufts University School of Medicine to examine how the mammalian olfactory system (sense of smell) functions and to apply the principles of a biological system in order to design a broad-based chemical sensing system. This project has generated international interest.

A recent area of interest is micro- and nano-fabrication which involves the design of very small structures on both the micro and nano scale for possible applications in microscopy, high density information storage and lithography.

There is no doubt that Dr. Walt's accomplishments have helped to thrust the Chemistry Department into a highly visible position in the scientific community.
Let us put YOU on the Tufts Chemistry WEB!

The Department of Chemistry's web site continues to grow! During the past semester we have added several new pages of information, but we would like to add even more. Especially for our alumni, we are creating an "Alumni Page" where we would like to list as many of you as possible. We would like to include not only names and e-mail addresses but items of interest and WWW links to alumni pages and your areas of current employment or involvement. So please write or e-mail one of us listed below if you would like to be included. Let us know where you are and what you are doing!

For those of you who are new to the Internet, the World Wide Web (WWW or web) is a combination of the worldwide network (known as the Internet) and various software systems, some of which can be accessed at the PC level using a "Web Browser." There are many types of browsers — Net-scape Navigator, Microsoft Explorer, and Mosaic are a few examples. Currently, Netscape works best with our web site, but all text information can be viewed with any browser.

The Tufts Chemistry homepage provides information such as course listings, degree requirements, faculty/staff/student info, the graduate program, special events, links to other chemistry resources, and group research information. The hope is that this resource will not only provide information for prospective graduate students and alumni, but will eventually contain within it links to many valuable chemistry resources within the department and throughout the world. To access the page from a Web browser, use the URL (Uniform Resource Locator):

http://www.tufts.edu/departments/chemistry/index.html

The page is currently maintained by Professor Sam Kounaves (skounave@emerald.tufts.edu)

---

**FACULTY AND STAFF NEWS**

**Arlene Chaplin** joined the staff in August 1996 as the Chemistry Department Manager. Arlene completed her undergraduate work at Northeastern University in Medical Laboratory Science and received a Master's degree from Boston University in 1995. Prior to joining the Tufts community, she was employed at the Deaconess Hospital in Boston in the Pathology Department. She brings to the department her experience in financial management, laboratory safety, and coordination of renovation projects.

The Annual Summer Picnic to welcome new graduate students was held last August. Achievement Awards were presented by Professor Marc d'Alarcao for outstanding performance during the Spring 1996 Semester:

**STAFF:** Janice Silva, Office Manager
**FACULTY:** Professor Arthur Utz
**GRADUATE STUDENT:** Laura Taylor

**Professor David Walt** has been interviewed on National Public Radio, CNN, BBC, and elsewhere to explain his collaborative research on the application of principles of a biological system (the mammalian olfactory system) to design a broad-based chemical sensing system.

**Professor Albert Robbat, Jr.** has developed PC-based software which has generated a great deal of interest among environmentalists. The technology, Ion Fingerprint Detection®, can detect complex mixtures (environmental, drug and explosives) in minutes rather than days where multiple chemical compounds are present. The rapid detection capability saves fifty to seventy percent of soil analysis costs.

The Annual Holiday Party in December at Alumnae Lounge was a festive occasion. Both faculty and graduate students demonstrated their theatrical skills by presenting comedic views of the department to colleagues, family, and friends in attendance. A highlight of the party was the presentation of the Fall 1996 Semester Awards for outstanding achievement. The presentations were made by Professor d'Alarcao to the following:

**STAFF:** Dr. Sarah Iacobucci, Laboratory Manager
**FACULTY:** Professor Robert Dewald
**GRADUATE STUDENT:** Robert Simpson

---

**CLASS NOTES**

**1950** Stanley R. Mackay (BS 1950) is retired and living in Marblehead, MA.

**1953** Harry Linde (BS 1950) retired in 1991 as professor and associate dean at Northwestern University. He is enjoying his leisure time cruising his motor yacht down the intracoastal waterway to Florida.

**1955** John Downey (BS 1955) died on January 11, 1996. He retired from Polaroid as a senior research group leader in 1993. His work there led to patents in polymer applications and silane coatings.

**1962** Henry Ferry (BS 1962) is teaching Biology and Chemistry at Mount St. Charles Academy in Woonsocket, Rhode Island.

**1970** Elwood G. Trask (PhD 1970) is a technical director at Gates Formed Fibre Products in Auburn, Maine. The company is a major supplier of molded trim components to the auto industry as well as a producer of polyester fiber made from recycled soda bottles. He is holder or co-holder of eight patents.

**1984** Dr. Carol (DiGusto) Burd (BS 1984) is a practicing intern at Harvard Pilgrim Health in Wellesley, MA.

**1985** Glen Bouchard (BS 1995) completed his residency in Emergency Medicine at University of Massachusetts Medical Center in 1994 and is currently practicing medicine as a member of the Wachusett Emergency Physicians' Group in Leominster, MA.

**1991** Kongrit Chukiert (BS 1991 – MS 1995) is currently at the Medical Center Hospital at University of Vermont in the residency program.

**1995** Martin Morrison (BS 1995) is employed by Osteotech, an orthopedic implant firm in Shrewsbury, NJ, where demineralized bone powders, gels, and flexible bone sheets are produced.

**1995** Glen Pearlstein (BS 1993 – MS 1995) is currently a research fellow with the NIAID Institute of the National Institute of Health (NIH).
Master's Degrees Awarded 1995-96

Peter J. Andrulis
Mei Hing Chu

Bachelor's Degrees Awarded 1995-96

Mark Casazzo
Luissette S. Delva
Nayomi K. Edirisinghe
Hiro Furukama
Babak Gojgini
Jeremie Hammond
Eugene S. Han

Marian McAllister
Paul R. McCabe
Margo G. Hartunian
Michael Lee
Daniel Minior
Hien Nguyen
Yelena Sinelnikova
Mary Tsikitis
Nilesh Vyas

Doctoral Degrees Awarded 1995-96

Frances R. Blanco (Harlan) "Isolation, Characterization, and Reactivity of a High-Valent Manganese Imido Porphyrin Complex"

Pericles Calias (d'Alarco) "Synthesis and Biological Evaluation of Water-Soluble Flavonoid Analologues: Inositol 2-phosphate-Quercetin Conjugates and Partial Synthesis of Phosphatidylinositol Glycans in the Study of Insulin Signal Transduction"

Brian G. Healey (Walt) "Design and Fabrication of Polymer Arrays on Optical Imaging Fibers and Their Use as Chemical Sensors"

Sigun Huang (Kenny) "Internal Rotation of the Isopropyl Group of Guaiazulene and a Method to Evaluate the Sachs Formula"

Stella Papasavva (Kenny) "Reducing the Risk of Global Warming from CFC Alternatives: A Scientific Basis for Policy Options"