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NESACS

THE NUCLEUS

October 2001 *Vol. LXXX, No. 2*

Monthly Meeting

Henry A. Hill Award to M. Simon; Eli M.Pearce, ACS President-Elect speaks

Book Review

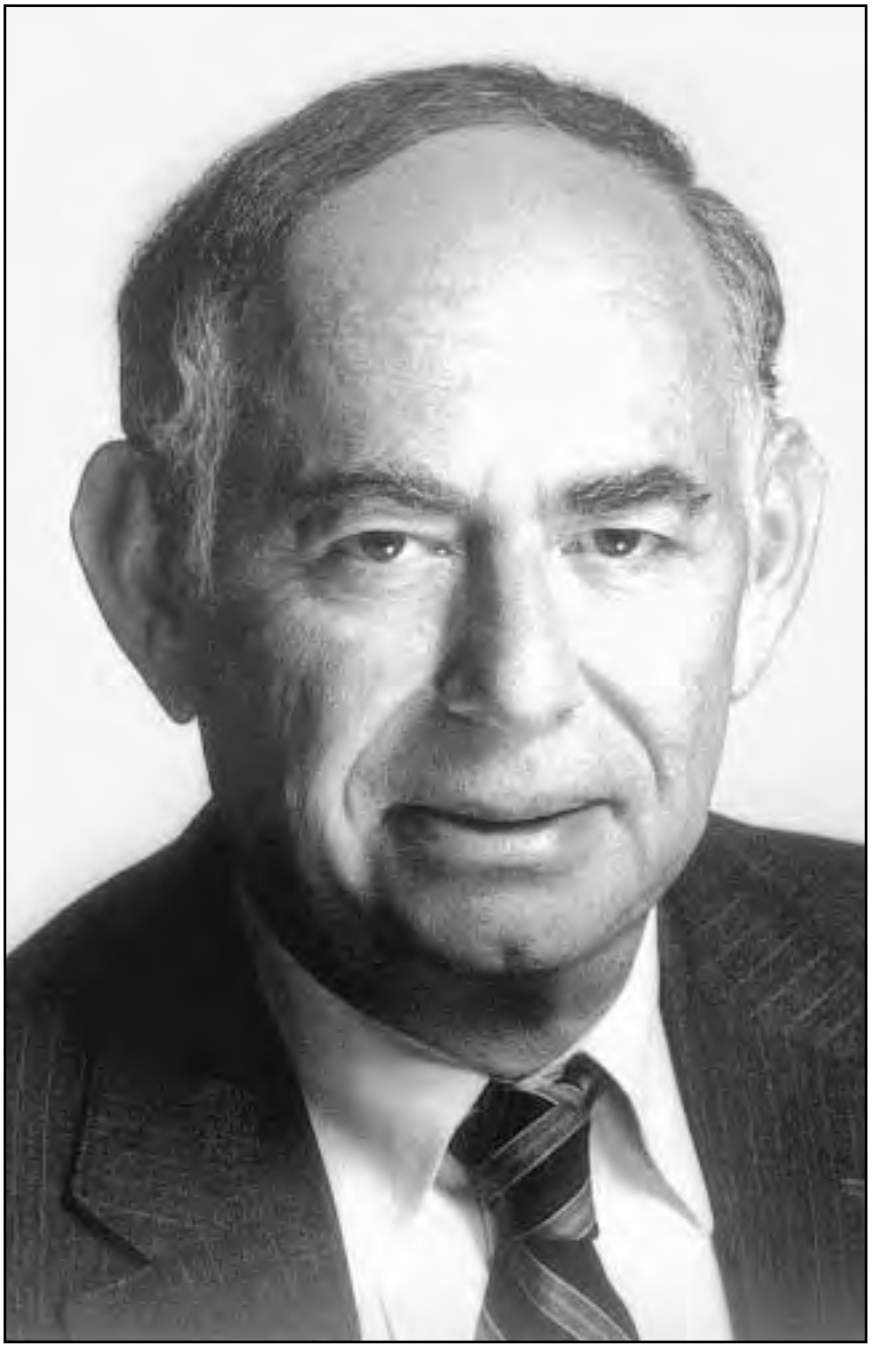
"Bold Science: Seven Scientists Who Are Changing Our World", by Ted Anton

Meeting Report

Chemical Education at German Universities by C. Bolm

Nucleus Buyers Guide

Listing of Suppliers, Products, and Services



Call for Papers

Undergraduate Research Poster Session

223rd National Meeting of the American Chemical Society
Orlando, Florida, April 7–11, 2002

The ACS invites undergraduate students to submit abstracts of their research papers for presentation at the Undergraduate Research Poster Session (URPS), which will be part of the extensive programming for undergraduates at this national meeting.

Submit your abstract electronically by

November 15, 2001 to <www.acs.org/meetings>.

Click on the CHED division and then select the URPS site that is appropriate to the subject of your paper. Please follow the directions carefully.

For further information, contact:
LaTrease Garrison
American Chemical Society
Undergraduate Programs Office
1155 Sixteenth Street, NW
Washington, DC 20036
Tel: 800-227-5558, ext. 6166
e–mail: l_garrison@acs.org ◇

Member News

The following will be honored at the Orlando ACS Meeting, April 9, 2002

David M. Lemal, Dartmouth, NH *ACS Award for Creative Work in Fluorine Chemistry*

Andrew G. Myers, Harvard *Award for Creative Work in Synthetic Organic Chemistry*

Charles H. DePuy, U. of Colorado, Boulder, *James Flack Norris Award for Physical Organic Chemistry* (Sponsored by NESACS).

James S. Panek, Boston University *Arthur C. Cope Scholar Award*

Matthew D. Shair, Harvard Univ., *Arthur C. Cope Young Scholar Award*

Our congratulations to these distinguished chemists. ◇

The Northeastern Section of the American Chemical Society, Inc.

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Frank R. Gorga, Webmaster
Washington, D.C. ACS Hotline:
1-800-227-5558

Contents

Deadlines: *December 2001 issue: October 19, 2001*
January 2002 issue: November 15, 2001

THE NUCLEUS

The Nucleus is distributed to the members of the Northeastern Section of the American Chemical Society, to the secretaries of the Local Sections, and to editors of all local A.C.S. Section publications. Forms close for advertising on the 1st of the month of the preceding issue. Text must be received by the editor six weeks before the date of issue.

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Directions

From Rte. 30 Westbound

A little over a mile from Rte. 128, at the top of the hill, take a hairpin left onto Oak St. (sign: Oak St. to Cliff Rd.). Follow the road 0.7 mile to a 4-way intersection. Go straight through, take second right onto Scotch Pine Rd.. Take first right (Westcliff Rd.). Henderson House is the first house on the left side (#99).

From Mass Turnpike West

Take exit 15 (Rte. 95/128). After toll booth bear left, follow Rte. 30 West. Proceed as above.

From Mass Turnpike East

Take Exit 14 (Rte. 95/128), follow sign for Rte. 128 North, then stay right for exit to Rte. 30. Turn left. Following Rte. 30 West. Proceed as above.

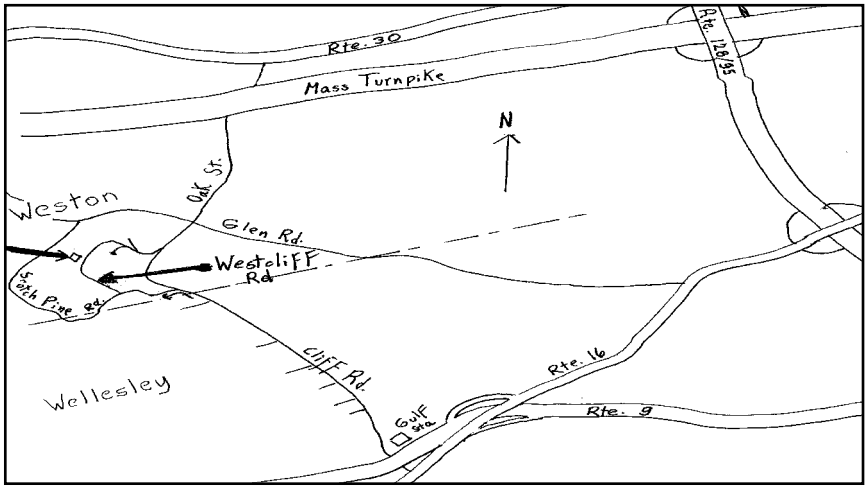
From Rte. 9 West

After crossing under Rte. 16, and after the traffic light at the fire station, turn right just after the Gulf Station. Take Cliff Rd. northbound (left). The seventh road on the left is Scotch Pine Rd. Turn left into this road, then the first right, Westcliff Rd. Henderson House is the first house on the left, #99.

From Rte. 95/128 North or South

Take exit 24 to Rte. 30 West (if southbound on Rte. 128) or exit 20B to Rte. 9 (if northbound on Rte. 128) and follow directions for Rte. 30 West or Rte. 9 West, respectively

Park in front of Henderson House, or in the large parking area to its right. Respect the privacy of neighbors, do not park in front of homes. ◇



Henry Aaron Hill

Who was Henry A. Hill?

Henry Hill was Chairman of our Section in 1963. He was very active in the national ACS, a member of and chairman of several of its committees. Especially notable was his service on the Professional Relations Committee, where he drafted the *Professional Employment Guidelines*. He was Director of the ACS in 1971-1975 and was elected President-Elect and became President in 1976.

Born in St. Joseph, Missouri, he obtained a bachelor's degree from Johnson C. Smith University, then a segregated university for "colored" students, as, they were then called. Because of his excellent record he was accepted at M.I.T., to study organic chemistry, and obtained the Ph.D. in 1942, working under Prof. Robert C. Hockett. He had the highest grades of the graduate students in his class. While at M.I.T. he became acquainted with Prof. James Flack Norris of whom he said:

He was the first big man I met who was more interested in my ability to learn chemistry than in the identity of my grandparents

Not being able to obtain a position in industry because of prevailing discrimination, he and a few colleagues established a small consulting business. In 1946 he joined Dewey & Almy Co. as Research Supervisor and in 1952 he became Vice President of National Polychemicals. He obtained patents for blowing agents.

In 1961 he established his own research and consulting business, "Riverside Laboratories", to be able to pursue his research interests and to allow him to participate in ACS activities.

After his untimely death in 1979, friends and colleagues in the Northeastern Section established the *Henry A. Hill Award for Outstanding Service to the Northeastern Section*. The first award was made posthumously to Henry A. Hill in 1980, his son Anthony C. Hill, then a reporter for WGBH, accepting the award. Since then, 26 members of this section have been thus honored and thereby honored the memory of Henry A. Hill.

From an appreciation of Henry A. Hill delivered at the 1991 Hill Award meeting and based on notes of the late Larry Powell. ◇

Monthly Meeting

Celebrating the 125th Anniversary of the ACS

The 827th Meeting of the Northeastern Section of the American Chemical Society

Thursday, October 11, 2001

Henderson House, 99 Westcliff Rd., Weston, MA

5:30 pm Social Hour; a table of Career Services Literature and Aids will be available

6:30 pm Dinner

7:45 pm Evening Meeting, Dr. Timothy Frigo, Chair, presiding

50-year members honored; welcoming new members

Presentation of the Henry A. Hill Award for Outstanding Service to the Northeastern Section to Dr.Myron S. Simon

Dr. Eli M. Pearce, President-Elect of the ACS speaks on *Chemistry's Changing Face Mirrors America*

Dinner reservations should be made no later than noon, October 4. Please call or fax Marilou Cashman at (800) 872-2054 or e-mail at MCash0953@aol.com. Please specify chicken, fish, or vegetarian. Reservations not cancelled at least 24 hours in advance must be paid. Members, $25.00; Non-members, $28.00; Retirees, $15.00; Students, $ 8.00.

THE PUBLIC IS INVITED.

Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so that suitable arrangements can be made.

Free Parking at Henderson House – do not park in the street or driveway.

Next Meeting: *Norris Award Meeting, November 8, 2001 at the Newton Holiday Inn, 399 Grove St., Newton, MA.. 5:30 pm Reception and dinner, Riverside Room; 7:45 pm Award Meeting. Awardee:Dr. Dennis Peters (Analytical Chemistry), Indiana University, Bloomington, IN*

Abstract

Chemistry's Changing Face Mirrors America

The changes in the composition of the chemical workforce mirror the changes in the U.S. population. In the last decade alone, women and minorities - African Americans, Asian Americans, Latinos and Native Americans - have become a significantly larger share of the workforce. They are, however, unevenly distributed across chemical specialties and economic sectors (government, industry and academe). The status of women, minorities and the particular challenges they face will be explored, along with present and potential responses to the changing face of 21st century chemistry.◇

Biography

Dr. Eli M. Pearce, a Brooklyn native, received a B.S. in 1949 (Brooklyn College), an M.S. from New York University, and a Ph.D. from Brooklyn Polytechnic Institute, working with Prof. Charles G. Overberger on cationic and anionic polymerization.

In 1958 he joined DuPont, in 1962 he became a Section Manager at J.T. Baker Co., and in 1968 a manager at Allied Chemical Corp. In 1974 he was appointed Director of the Dreyfus Laboratory at Research Triangle Park, and shortly thereafter he joined the Polytechnic University of New York as Professor of Chemistry. and Chemical Engineering.

At Polytech he has served as Department Head, Dean of Arts and Science, Director of the Polymer Research Institute and is presently University Research Professor.

His researches in polymer chemistry involved both theoretical and practical aspects, with a special interest in flammability studies, and fluorine containing polymers, as well as fundamental studies of the relationship between mixture components and the physical and chemical properties of resulting polymers. His researches have resulted in over 250 papers and four patents.

Dr. Pearce has been the editor of the *Journal of Polymer Chemistry* for 25 years and is on the editorial board of several polymer-related journals and co-editor of six books dealing with flammability, fibers, and the future of polymers, and laboratory manuals.

He is a fellow of AAAS, AIC, NYAS, SPE, and NATAS and has been very active in the American Chemical Society, having been on, or chaired many of its committees and has been a Director-at-Large from 1999-2000. He has been elected to be the current President-Elect and is to be President of the ACS for 2002.

He has also been active in numerous national and international committees and societies. He has co-chaired two Gordon Conferences in his field.

He has received a number of awards, including the ACS Polymer Division's Distinguished Service Award (1991), the P.J. Flory Polymer Education Award (1992), and most recently, the Oscar Riker Foster Award of the Chemistry Teachers Club of New York (2000).

He lives with his wife Judith in East Hampton, NY.◇

WANT MORE ARTICLES?

Membership surveys show that you want more articles in the Nucleus. If you tell our advertisers that you saw their ad in the Nucleus, they will provide more financial support and this will allow us to add articles.

Henry A. Hill 2001 Awardee

Myron S. Simon

The Henry A. Hill Award is given for "Outstanding Service to the Northeastern Section." This year's awardee is Myron S. Simon, a long-standing member of the Section, and for the last eight years its Archivist.

He obtained the A.B., M.A. and Ph.D. degrees at Harvard, the latter from Professor R.B.Woodward in 1949. He was a research scientist at Polaroid Corporation from 1949 to 1988, primarily doing research in the field of instant color photography, obtaining more than 70 U.S. patents, and retiring in 1988 as Research Fellow and Associate Director of Organic Chemistry. He consulted as founder of Image-Ination Associates until 1996.

He was Chairman of the Section in 1985, Chairman-Elect and Program Chairman in 1984, Alternate Councillor, 1984-93, Trustee in 1987. He sponsored the Seaborg Proposal to end nuclear testing in 1985, which led to a Presidential Debate at the ACS Chicago Meeting that year. He proposed the Secondary School Teaching Prize, now the Theodore William Richards Award for Excellence in Teaching, and Aula Laudis Society in 1985 to recognize superior teaching at the high school level.

He was a co-founder of the Esselen Award Committee and its member, 1985-1993 and 1995-1999, and Chairman 1985-1988, 1991 and 1997. He chaired the Committee on Professional Relations 1987-92 and has been the Associate Editor of the NUCLEUS since 1988. He was a member of the Centennial Committee in 1998. He chaired the Tours Committee at the last two ACS National meetings in Boston, and was a member of the IUPAC Planning Committee for its Boston Meeting in 1987. ◇

Fifty-Year Members

To be honored at the October meeting

Dr. Robert Abeles
Waltham, MA

Dr. John Buchannan
Cambridge, MA

Dr. Sherman L. Burson, Jr.
South Chatham, MA

Mr. Richard S. Cass
Watertown, MA

Mr. Ernest J. Comeau, Jr.,
Hampton, NH

Mr. Bennett S. Gesmer
Waban, MA

Dr. Theodore W. Gilbert
Nantucket, MA

Mr. Thomas J Giovanniello
Milton, MA

Dr. Martin Idelson
West Newton, MA

Mr. Irving Isgur
Framingham, MA

Dr. Paul R. Jones
Ann Arbor, MI

Mr. Roger J. Labrie
Plainville, MA

Dr. Jack L. Lapuck
Newton Center, MA

Mr. Giuglio Lopolito
Burlington, MA

Mr. Robert H. Mc Cluer
Houston, TX

Dr. Jack Milgrom
Maywood, NJ

Mr. Arthur T. Nelson
Scituate, MA

Mrs. Betty H. Palm
Lexington, MA

Mr. Charles A. Rossiter
Wellesley, MA

Dr. Dietmar Seyferth
Cambridge, MA

Dr. Stephen J. Tauber
Lexington, MA

Dr. Grant Urry
Winchester, MA

Dr. Bert L. Vallee
Boston, MA

Our best wishes to these 50-year members. ◇

ACS Election

Candidates for President-Elect have submitted the following. Ballots will be mailed to members in October.

William F. Carroll, Jr.

Value Matters

My first priority: Value. Specifically, I want to increase ACS' value to members. We create value by innovating to address needs. Here are two examples:

- Better continuing education materials that help members anticipate, adapt and grow into career changes, thus becoming more valuable within their place of employment.
- Intensive teaching course and streamlined certification process for chemists with advanced degrees or experience desiring a career transition to K-12 education.

We communicate value by listening to members and by making benefits relevant and accessible. We quantify value to verify when we're successful and when improvement is needed. Evaluation and innovation must be continuous. Our members have diverse backgrounds, ranks, positions and needs, but value matters to all.

My second priority: Outreach. The most visible representative of the Society must reach out to non-scientists. As President, I will pursue speaking and listening opportunities with lay organizations at least twice a month. We are rightfully concerned about chemophobia, but we can be agents for "chemophilia" as well.

Outreach and service components of National Chemistry Week, such as demonstrations for students and teacher training, make members feel they "make a difference." They value that feeling. Taking on a service ethic as a scientific Society links chemistry and chemists with everyday life and ordinary people, for the betterment of all.

Expect your officers to focus on ACS' value proposition. Tell me where you see value and where you don't. Together we can maximize it, and create more.

I value your participation in this election, and respectfully ask for your vote. In return, I commit to use my ability and experience to bring value to ACS members, to our Society and to society at large.

Because in the end, value matters.

Please visit http://www.billcarroll.org for more information or to comment directly.

Elsa Reichmanis

Planning Together Today to Meet Tomorrow's Challenges

The role that chemistry plays and will continue to play in the development of innovative new technologies is expanding. From pharmaceuticals and biotechnology, to new high performance materials with unique properties, an understanding of chemistry is imperative. For those of us in the field, keeping up with the latest breakthroughs is critical.

As President of the ACS, I will work to encourage programming that better addresses the current and future needs of chemists and chemical engineers. I know that many chemists are unable to attend national meetings, and the Local Section is their contact with the ACS. I would like to work with both the Local Sections and ACS Career Services in presenting more programs to help members expand their skills to become better equipped to meet today's dynamic employment environment. I believe that the chemical workforce will be in a better position to respond and react to change, when it is prepared!

Also of prime importance is the issue of public outreach to both our local communities and our legislators. The public image of chemistry needs improvement. The general public must be made aware that it was chemists and chemical engineers who developed new drug therapies that have revolutionized modern medicine; and few individuals appreciate the important role chemistry has played in the development of electronic devices and displays.

I am aware of the Society's efforts to reach out to legislators at both the federal and state levels. It is important to both continue these efforts and increase the level of member involvement. As President, I would like to strengthen support for these critically important Local Section endeavors.

If elected ACS President, I will emphasize that the most valuable resource that the ACS has is its membership.

For more information, please visit www.elsareichmanis.net◇

Teachers' Conference

Convergence of Chemistry and Physics

The Joint Meeting of New England Section of the American Association of Physics Teachers (NESAPS) and the New England Section of the American Physical Society (NESAPS)

November 2-3,
Keene State College

Presentations will include individual presentations, as well as workshops on *Integration of Physics And Chemistry with HS Math, The Physics of Chemistry, Using Excel in the Physics Classroom*. There also will be roundtable discussions.

For information:
<http://webphysics.tec.nh.us/nesaapt/index.html> ◇

Grants-in-Aid to Undergraduates

To attend the 223rd ACS National Meeting in Orlando, FL
April 7-11, 2002

The Northeastern Section of the American Chemical Society will provide *Grants-in Aid* of $250 to each of four undergraduates to enable them to attend the 223rd ACS National Meeting, and present a paper at the Undergraduate Research Poster Session in the Division of Chemical Education. The institutions of the successful applicants are expected to match the award.

Eligibility: Applications will be accepted from students at colleges and universities within the Northeastern Section. The undergraduate student must be a chemistry, biochemistry, chemical engineering, or molecular biology major in good standing with at least junior status, and must be currently engaged in undergraduate research.

Application: Application forms are available from departmental offices and the NESACS office. In addition, application forms may be obtained from the NESACS Web site at http://www.nesacs.org. The deadline for *receipt* of completed applications is *November 1, 2001*. Completed applications are to be sent to:

Professor Ruth Tanner
University of Massachusetts Lowell
Department of Chemistry, Olney Hall
265 Riverside Street-Room 520
Lowell, MA 01854-5047
Phone: (978) 934-3662
Fax: (978) 934-3013
e-mail: Ruth_Tanner@uml.edu

Notification: Applicants will be notified of the results by e-mail on November 6, 2001.

The deadline for electronic submission of abstracts to the American Chemical Society in Washington, D.C. is November 15, 2001. ◇

National Chemistry Week

November 4-10, 2001
Celebrating Chemistry and Art

The theme is "Celebrating Chemistry and Art". The Northeastern Section is planning two days of events:

Sunday, Nov. 4th, at the Museum of Science in Boston NESACS will feature two presentations by Prof. Bassam Shakhashiri of the University of Wisconsin. Many of us have seen his lecture demonstrations in the past and, along with all the children in the audience, have found them to be delightful and very informative. The Museum will devote the entire day to numerous demonstrations and displays that will celebrate the union between chemistry and art.

Tuesday, Nov. 6th , on a more scholarly note, a half-day symposium on "Chemistry and Art" will be held at The Forsyth Institute from 4 to 8 PM. Seminar topics will range from the uncovering of art forgeries, the role of chemistry in art conservation, and the chemical analyses of African art. Among the featured speakers will be Prof. Michael Henchman and Dr. Orrie Friedman of Brandeis University, Mr. Michael Douma from Washington D.C., Dr. Janet Schrenk of MIT, Dr. Richard Newman of the Boston Museum of Fine Art, Prof. Margaret Merritt of Wellesley College, Ms. Francesca Bewer of the Straus Center for Conservation at Harvard University, and others. Audiences will be able to join in the discussions during open "Ask the Speakers" periods.

The Forsyth Institute, with its world-renowned research program housed in a remarkable building with marvelous architecture and a beautiful collection of Delft tiles, is an ideal location for this symposium. It is located at 140 The Fenway, next to the MFA (parking available in the adjacent parking lot).

For more information, see the NESACS website: http://www.nesacs.org ◇

ACS/NESACS News

Recent Government Relations Activities

By Michael J. Hearn

On 30th April the Northeastern Section was very well represented at the Washington meeting of the American Chemical Society Joint Board-Council Committee on Chemistry and Public Affairs (CCPA), with participation by Drs. Doris Lewis, Tim Rose and Michael Hearn. In several actions the CCPA broadly supported the goals of the ACS on federal funding for research and development, the environment and science education. Members of the CCPA were briefed by a number of officials from the Administration, including the new science and technology advisor to Secretary of State Colin Powell, Dr. Norman Neureiter, who is himself a Ph.D. chemist.

Over 200 scientists and engineers converged on Capitol Hill on May 1-2 for the sixth annual intersociety Science, Engineering, and Technology Congressional Visits Day. The purpose of the day was to show united support for increasing federal funding for R&D. The multi-society event included 38 members of the ACS Board of Directors, the Committee on Chemistry and Public Affairs, and local sections. Drs. Tim Rose and Michael Hearn of the Northeastern Section joined President-Elect Eli Pearce and numerous other ACS members from around the country in calling on Representatives and Senators in the United States Congress to voice support for ACS positions on science education, the environment, and federal funding for research and development.

Before meeting with their legislators, participants had been briefed by Joseph Bordogna, Deputy Director of the National Science Foundation; Daniel Goldin, Administrator of the National Aeronautics and Space Administration; James Decker, Director of the Department of Energy's Office of Science; Karen Brown, Acting Director of the National Institute of Standards and Technology; and Marcus Peacock from the Office of Management and Budget. These policymakers discussed the agencies' budget priorities and gave an overall picture of the administration's budget. Representative Ralph Hall (D-TX), top Democrat on the Committee on Science, also provided an overview of important science issues being discussed in Congress.

The second day of the event began with a breakfast briefing keynoted by Representative Sherwood Boehlert (R-NY), Chairman of the House Committee on Science. He urged scientists to continue pushing for investments in R&D. Having recently spoken with his congressional colleagues and administration officials about the budget, Rep. Boehlert was optimistic that more money would be available for research in this year's budget than initially anticipated. He also stated that the science community should not view the administration's delay in naming a science advisor as a sign that the president is not interested in science. According to Rep. Boehlert, the administration is very interested in science issues.

Immediately following the briefing, ACS members visited with members of Congress to deliver the message that federally funded research is our nation's foundation for the future. They emphasized that the right mix of tax incentives, intellectual property incentives, and federally supported research is imperative for continued science innovation and economic growth. ACS members also advocated increased funding levels for the National Science Foundation (NSF), the Department of Energy, the Department of Defense, and the National Institutes of Health. Most of the over 60 congressional offices that were visited responded by expressing support for federal investments in R&D, especially for NSF. Among the offices visited were those of Senators Kennedy, Schumer, Clinton, Lieberman, and Dodd and those of Representatives Simmons and Gilman. As well as supporting ACS positions, ACS participants indicated that the Society can

continued on page 10

ACS/NESACS News

Continued from page 9

serve as a valuable resource of information and interpretation of science matters for legislators. The true impact of these visits will not be known until the conclusion of the appropriations season. ACS members can learn more about this at the ACS website (http://congress.nw.dc.us/chemical/)

On Monday, 7th May, Drs. Mike Strem and Michael Hearn visited the Massachusetts State House to personally deliver letters of support from ACS President Attila Pavlath on proposals for significant new Commonwealth legislation on the environment and public health. Drs. Strem and Hearn were joined by Ray Garant (ACS Washington staff) and Matt Gardner (MIT). The letters were addressed to The Hon. Marian Walsh (Joint Committee on Taxation) and The Hon. Richard Moore (Joint Committee on Health Care), Chairs of key committees for passage of the ACS-supported measures. The new bills have been introduced by Representative Douglas Petersen. ACS members are invited to visit the ACS website (http://congress.nw.dc.us/cgibin/statein dex.pl?state=ma&dir=chemical) to learn more about these measures and how they can voice their opinions

A CALL FOR
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Phone for more details
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Tel: 617-969-5712

Meeting Report

Chemical Education at German Universities

Summary of the address by Prof. Carsten Bolm, (Institute for Organic Chemistry, Rhine-Westphalia Technical University, Aachen) at the May 3, 2001 Symposium, held at Boston University.

General Introduction

A recent article in the *Wall Street Journal* stated: "Once proud German universities now get low marks". This talk showed that this is not correct, at least not as far as professional training in chemistry is concerned.

Students who enter universities in Germany do so after passing the terminal examination in high school, the Abitur, at age 18 or 19. Some students take a "Fachabitur" in some special branch, instead, which allows them to enter a "Fachhochschule". Most students with Abitur or Fachabitur will go on to university-level studies (68% in 1999, but down from 82% in 1990, which has caused concern). Many with Abitur will attend a University or a Technical University, resulting in a Diplom degree (4-5 years) and probably Ph.D. (called Dr. rer. nat.), those with Fachabitur will attend a Fachhochschule, resulting in Dipl. Ing. (Diplom in Engineering) degree.

A few institutions now give Bachelors and Masters degrees.

In Germany currently 28% of pupils born in one year will go on to a university or technical university. In some countries about 40% go to universities, but in Germany there are other pathways of specialization outside of the usual university system.

Currently there are 308,000 beginning students in German universities, but the prediction for 2015 is only 274,000, which is a cause of concern.

Universities and Technical Universities focus on research; the Fachhochschulen focus on applied subjects leading to the Dipl.Ing. degree.

In German universities there are currently 55 chemistry departments. In addition, there are biochemistry departments, food chemistry departments, etc.

The total number of chemistry students (for 1999) was 21,000 in universities, and 4,300 in Fachhochschulen. Chemistry departments are distributed in universities all over Germany, with fewer being in the former East Germany.

How do students who want to study chemistry decide which university to attend?

Those who are interested in a research career will choose to go to a university, those who are interested in practical applications will choose a Fachhochschule. In addition, some institutions have specialized departments which may be chosen by a minority of students.

In the U.S., ratings of colleges and universities are very important factors in student choice. Even though there are such ratings (most recently in the Stern, a popular illustrated magazine) such ratings do not have much impact on students' choices in Germany.

In fact, most students choose a university close to home, or mostly in the same state. Another factor, as to the subject chosen, is the expense of study: Although there is no tuition at German universities, and all universities are under state control and financed by the state, living expenses are considerable, so that studying chemistry to the Diplom will require expenditures of about $50,000.

Another difference from study in the U.S.: Students tend to stay at the same institution, even after the 4-5 year Diplom degree they are likely to stay at the same university for pursuing the doctor's degree. Only about 16% move to another university for their doctoral work after completing the Diplom degree.

Whereas American chemistry students tend to select graduate schools because of the reputation of their chemistry departments, in Germany the primary selection would be that of the professor of the student's choice.

continued on page 11

Compared to the U.S., there are very few post-doctorals in Germany, and those often come from other European countries or Asia.

How is the chemistry curriculum organized?

In the traditional course of study, entering students will have 4 semesters of basic study, including much laboratory work, followed by a preliminary examination (Vordiplom), which must be passed to be allowed to go on, followed by four semesters of advanced study, again including laboratory work, followed by 1-2 semesters of research for a diplom thesis and a series of diplom examinations. After this the student receives a Diplom degree (Dipl.Chem. or Dipl.Ing.). The total time for this will be about 5 years.
Most of the students will go on for doctoral study, which is entirely research, requiring approximately 7 semesters, and resulting in the Dr. rer.nat. (Ph.D.). About 90% of those receiving the Diplom degree go on for doctoral study.

As an example, at the Aachen Technical University, in the first year students each week will take four hours of Physics lectures plus two hours lab, three hours Inorganic Chemistry lectures plus 12 hours lab and three hours of mathematics. In following years, the courses will be in analytical, organic, physical chemistry, etc. By semester 8 there will be few lectures, but mostly lab. work.

Obviously, German chemistry students spend much more time in the laboratory, and fewer hours in lectures than in the US. In addition, it is to be noted that German students will take no courses other than chemistry or related subjects, i.e. no "distribution courses".

After the Diplom degree, doctoral study is primarily specialized research work.

Grading:

German grading is 1-6, with 1 being best (very good), 2 good, etc.

An example of grades given: About 26% of diplom students will receive "very good", about 50% "good". By the time they have gone on to the Ph.D., 73% will receive "very good" marks, and 15% "distinction", which is above "very good".

Future trends

Was covered more in detail by Dr. Mitchell's talk. The meeting in Bologna may result in internationalizing chemistry study to a greater extent, with the programs in the European countries becoming more alike. Recommendations may result in educating students more broadly, i.e. getting away from the high degree of specialization that currently exists.

The first degree may become a Bachelor's degree, which comes earlier than the current Diplom degree.

In addition, there may be a division in paths to research and to applied degrees or joint degrees, such as chemistry and economics, for example.

This combination already exists at the University Ulm where a Diplom degree is given in chemistry and economics ("Wirtschaftschemie") after 8 semesters. A similar combination degree is given at the University Clausthal after 6 semesters of study, followed by a Master's degree. Many other combinations may be given.

Since all universities operate under government control and with government monies, when the number of students in a department becomes too small, the government may actually close departments. Currently two departments are in danger of losing chemistry departments for this reason.

How do you become a Professor in Germany?

After receiving the doctor's degree, most of those aspiring to an academic career will do a post-doctorate, frequently in another country, including many in the U.S. Following this, the aspirant will select a strong mentor, i.e. a professor in the field of interest, with whom the aspirant will carry out independent research for another 3-5 years, resulting in another thesis, and if successfully completed and defended, resulting in "Habilitation", the permission to teach at the university level. If the mentor is very strong, the research carried out may be influenced by the mentor's interests. Also, the choice of topic will be determined by the availability of rather scarce research funds. After habilitation, the title will be that of "Privatdozent", with unsure monies available either for research or maintenance. The system is very brutal: If successful and the Privatdozent is invited to a position at a university, the aspirant is almost assured to obtain a position for life, as Professor, and finally to retirement. If the Privatdozent does not succeed in obtaining a position, it is total failure. There are no lesser schools where there might be positions, which is different than the situation in the U.S. where those who do not succeed in obtaining faculty positions at the major research universities may be able to join the faculties at non-research universities or colleges.

Under a new system being discussed, junior professorships have been considered, but the idea is not liked by most chemistry academics.

To give an example of the German university system, Dr. Bolm gave his own *curriculum vitae*: He started out at Braunschweig University, was one of the few who changed to another university (Madison, WI), then received his Diplom degree at Braunschweig. He was among the 16% who go to another university for the doctor's degree, in his case at Marburg. After post-doctoral work in the U.S. (MIT) he habilitated in Basel, Switzerland and became Professor of Chemistry in Marburg. Later he received a call to Aachen for a full professorship, his present position. ◇

New England Chemists

ACS "Moving Forces" IV. Arthur C. Cope (1909-1966)

By George B. Kauffman

The series commemorates the 125th anniversary of the founding of the ACS in 1876, to be celebrated this year.

Reprinted by permission from *"Chemical Heritage"* 19:1 (Spring 2001) 47-48.

Arthur C. Cope was truly a moving force in the ACS. Renowned for his pioneering scientific contributions, he is also revered for his endowment of the Arthur C. Cope Award. Cope bequeathed half of his estate to the ACS to advance research and education in organic chemistry. This endowment funds the Cope Award, which has supported significant research by some of the most eminent organic chemists of our time, and its companion the Cope Scholar Award, which has helped train and nurture young scientists. In 1998 he was nominated by readers of *Chemical and Engineering News* as one of C&EN's Top 75 Distinguished Contributors to the Chemical Enterprise; and at the 217th National Meeting of the ACS in Anaheim, California, 21-25 March 1999, the Division of Organic Chemistry held a two-day symposium to mark the Cope Award's 25th anniversary and to commemorate Cope's legacy. Fourteen of the 19 living Cope medalists, a virtual who's who of international organic chemistry, including two Nobel laureates, spoke at the symposium.

Arthur Clay Cope was born on 27 June 1909 in Dunreith, Illinois, the son of Everett C. Cope and Jennie Cope (née Compton), grain-storage operators. He earned his A.B. degree from Butler University in Indianapolis in 1929, then received his Ph.D. degree in 1932 from the University of Wisconsin. For his doctoral research, supervised by Samuel M. McElvain, he worked on barbiturates and synthesized compounds to be tested as local anesthetics, one of which was eventually developed for clinical use. Cope remained interested in medicinal chemistry for many years.

After a postdoctoral year as a National Research Council fellow at Harvard University with Elmer P. Kohler, in 1934 Cope became an associate at Bryn Mawr College, which had a long tradition of teaching and research in organic chemistry. He became assistant professor in 1935 and associate professor in 1938. During his research on the synthesis of barbiturates he discovered a new rearrangement, similar to the Claisen rearrangement, that involved the shift of allyl groups in a three-carbon system. The method, known as the Cope rearrangement, was useful for synthesizing complex natural products. It earned him the ACS Award in Pure Chemistry in 1944.

In 1941 Cope was awarded a Guggenheim fellowship for "Studies of

the Phenomenon of Tautomerism," and he became associate professor at Columbia University. From 1942 to 1944, while on leave from Columbia, he worked on chemical-warfare agents and antimalarial drugs as technical aide and section chief in the Division of Chemistry of the National Defense Research Committee. In 1945 he was appointed professor of chemistry and head of the Division of Organic Chemistry at the Massachusetts Institute of Technology. Six months later he became head of the chemistry department, a position he held until 1965, when he was appointed the first Camille Dreyfus Professor in Chemistry in recognition of his outstanding contributions to the department. He hired a number of brilliant chemists, including the organic chemists John D. Roberts, John C. Sheehan, and Gardner C. Swain, and developed one of the nation's most outstanding chemical research departments.

Cope's research involved medicinal compounds, reactions of cyclic carbon compounds, reactions across rings, carbonyl reactions, amine oxide rearrangements, optical activity in cyclic olefins, structures of antibiotics, and reactions of platinum, palladium, and cobalt salts with unsaturated hydrocarbons to form metal-carbon bonds. Besides the Cope rearrangement, his resolution of trans-cyclooctene, a triumph of experimental skill, provided further support for concepts of three-dimensional arrangements of organic compounds. He published more than 200 papers and was a consultant for Sharpe and Dohme, DuPont, and Merck. His collaboration with Merck led to four new compounds, including the sedative Delvinal Sodium and the muscle relaxant Flexeril (cyclobenzaprine hydrochloride). Many of his numerous students have had outstanding research careers in their own right.

Cope was extremely active in his work for the national community of chemists; much of his work was, associated with another ACS "moving force," Roger Adams (see *Chemical Heritage*, Summer 2000, pp. 47-48). He combined significant scientific research with valuable public service; few ACS members have devoted more time to the society than Cope. He served on its board of directors (1951-66), was chairman of the board's publications committee (1952), and was twice elected chairman of the board (1959—60; 1962-66). He was also elected chairman of the Division of Organic Chemistry (1947), chairman of the Northeastern Section (1955), and president of the society (1961). He served on the Committee on Professional Training for nine years and on the editorial boards of the annual publication Organic Syntheses and serial publication Organic Reactions. He also served as chairman of the Chemical Section of the National Academy of Sciences, to which he was elected in 1947.

Cope's awards included the ACS Award in Pure Chemistry (1944), Columbia University's Charles Frederick Chandler Medal (1958) for his work on medium-sized ring compounds and his recognition of transannular reactions, the ACS New York Section's William H. Nichols Medal (1964), and the ACS Roger Adams Award in Organic Chemistry (1965).

In 1930 Cope married Bernice Mead Abbott. The couple had no children and were divorced in 1963, the year in which he married Harriet Packard and acquired a stepson, Gregory Cope. He was not a demonstrative person but knew how to use power effectively. He died of a sudden heart attack while dining with ACS colleagues in Washington, D.C., where he had gone to attend an ACS board of directors meeting.

Cope's estate, resulting from royalties, patents, and successful instruments, was considerable, and the Cope Award that the ACS funded with its half was first given in 1973 to Robert B. Woodward and Roald Hoffmann. The award, the most lucrative administered by the ACS, recognizes "outstanding achievement in the field of organic chemistry the significance of which has become apparent within the [preceding] five years." The award currently includes a gold medal, $25,000, and an unrestricted grant-in-aid of $150,000; and Cope's endowment has grown so much that in 1984 the ACS used the income to establish the Arthur C. Cope Scholar Award, currently $5,000 and a $40,000 unrestricted research grant. Each year up to ten scholars are named.

Thus, long after his premature death, Arthur C. Cope continues to contribute to the science and profession that he loved so well.

For further Reading

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Book Review

Bold Science: Seven Scientists Who Are Changing Our World,

by Ted Anton (W.H. Freeman and Company, 2000)193 pp., ISBN: 0716735121; $24.95 (hardcover)

Reviewed by Maryann C. Kenney, Evergreen Solar, 211 Second Avenue, Waltham, MA 02451

What is *Bold Science?* It is the quest for answers to the far-reaching questions of our times; questions that range across conventional disciplines and challenge our knowledge of the world. While we could all easily choose great names from the past who followed this bold approach, picking names from today's diverse roster of scientific endeavor is more complex. Ted Anton has selected seven scientists who have made dramatic contributions to important, timely fields that have significant implications for the progress of science.

In each chapter Anton traces the scientist's early path, the varied approaches and turns upon this path, and the larger significance of the work accomplished. This book is very readable, even without extensive knowledge of these fields. Several chapters are extremely evocative portrayals of the individual behind the research; their drive to question, to educate themselves and to form new answers. According to Anton, "By combining the cheap tools of personal computers, remote sensors, the Internet, and basic artificial intelligence systems, they began to open an exhilarating and frightening era in genetics, ecosystems, cosmology, and neuroscience". The first chapter, on Craig Venter, embodies much of this approach. Combining automated DNA sequencing techniques, available libraries on the Internet and computer analysis, he moved ahead the effort to map the human genome at a dramatic pace.

In the second chapter, we are drawn into the whirling mind of Susan Greenfield as she began her studies as a philosophy major, moving by chance and inevitability into the field of neuroscience. Here is a scientist relentlessly curious, questioning the workings of the mind, and playing catch-up in a field she had just joined. Susan Greenfield is also a good example of Anton's point, that modern bold scientists are often adept at using the media to communicate their bold ideas and educate the non-scientific public. She is well known for her BBC series and popular book on the brain.

The third chapter, on Geoffrey Marcy in his long and lonely quest for extra-solar system planets is the most compelling in its tale of many years spent in the trenches of scientific endeavor. We are shown a young astronomer who, early in his career, had declared himself a "fully fledged failure". From these feelings he reached out to a scientific quest he truly loved, something he could pursue regardless of career success or failure. There followed years of hard work, teaching full days, pursuing astronomy nights. He worked on the proverbial shoestring, cajoling help, embodying teamwork, and faced with setbacks. We are uplifted in his eventual triumph.

In the remaining chapters, Polly Matzinger conceived of an entirely new model for immunology and the fundamental question of how the body tells self from non-self. Her path to a career in science is a fascinating tale of many early turns and broad ranging interests in life. Her approach was interdisciplinary, and at times combative, but dramatic in its result. Saul Perlmutter's quest is to find and measure supernova explosions as a way to probe the age and fate of the universe,

continued on page 15

Book Review

Continued from page 14

To do this successfully, he used the Internet, and his personal enthusiasm, to coordinate the searches of observatories around the world. There were times of solid collaboration, but also events of professional jealousy. Gretchen Daily combined the disciplines of economics, ecology, biology and chemistry to ask "big questions about the complex interactions of nature and our role in it." She launched her path through the unlikely coupling of German literature and Geology. Carl Woese did nothing less than find a whole new kingdom of life with startling implications for where we fit in the grand schema of earth.

In the final chapter, Anton tries to weave together common threads from all of the scientists. For many, the presence of the Internet has brought the international research community closer, and has allowed faster collaboration across fields and geographic boundaries, accelerating the pace of progress. It has also brought a heightened sense of competition in the drive to be first, and the desire to be acknowledged. At the same time, there is a refreshing sense of teamwork among many of these scientists, and a willingness to discuss and explore in the classic traditions of academia. We see repeatedly the power of the academic soirée, and the exchange of ideas over good wine and food. Undeniably, computer technology, new sensors, and more processing power, have made studies possible that would have been unheard of ten years ago. Also, in many of these tales, the scientist professes a profound doubt or insecurity in his or her own abilities at some point in their career. How reassuringly human this is. Perhaps each is most bold in their very unique and personal quest for science. ◇

Council Meeting Report

Chicago, IL, August 29, 2001

Our Section was fully represented by 10 Councilors and two Alternate Councilors.

About the ACS meeting itself, by Tuesday a.m. the total registration was 15,290. Combined with the good attendance at the San Diego Meeting, this constituted the largest yearly attendance at national meetings in ACS history.

At the National Employment Clearing House, 1392 positions were listed by 169 employers. There were slightly over 1000 job seekers.

The following items were presented for approval by Council:

(All NESACS Representative voted in favor of the motions presented and passed by the Council).

Increasing Size of Society Committees, B.III, Sec. 3,e(7), which was presented for Urgent Action.

A corresponding increase of Standing Committees and Elected Committees had been voted at the San Diego meeting. After receiving reports from major committees who were opposed to Urgent Action (i.e. immediate action without the benefit of prior discussion of the merits of the petition in committees), it was MOVED that the vote on Urgent Action be postponed indefinitely. This was a maneuver to allow the petition to go back to the petitioners for suitable modification since there was an inconsistency between the proposed Society Committee size and other provisions in the bylaws, which require at least 2/3 of the members being councilors – (the proposed maximum size [20] is not divisible by three). Defeating Urgent Action itself would have had the effect of assigning the petition immediately to a committee without it being able to change the numbers beyond those in the petition. The

Continued on page 16

Council Meeting

Continued from page 15

Council VOTED in favor of indefinite postponement with only a few "nay" votes.

Meeting Registration Categories B. VI, Sec. 4,b and Section 4,e.
The effect of this petition is primarily to eliminate the distinction between domestic and foreign non-members registrants as far as registration categories and meeting fees are concerned. Also, a new registration category for Student Affiliates is proposed. The net effect of the change would be to increase the registration fees for non-member chemists or visitors from abroad to be the same as those from the U.S. and Canada.

The amendment was VOTED with only a few nay votes.

Clarification of Requirements for Membership, B. I, Sec. 3,a
A separate category for those with an associate degree or equivalent and five years experience in chemical science is to be provided by this petition. Currently, Chemical Technologists who apply for membership can be accepted under B.I, Sec.5 (Less formal training than above, but with significant achievement in chemical science), but each case has to be considered individually. With the new provision, admission is simplified for this category of members. The Petition was VOTED unanimously.

Among the Committee reports, the Committee on Budget and Finance reported that largely because of the decrease in interest rates, the income of investments of the ACS was projected to be lower than budgeted by about 8 M$ for 2001. However, better than expected revenues from the Chemical Abstracts Services partially made up for this deficit.

The Committee of Divisional Activities MOVED that a Probationary Division of Laboratory Automation be established, which was VOTED with only one nay vote.

The Committee on Meetings and Expositions reported that at this meeting 6089 papers were presented in 66 sessions, including the several poster sessions. At the Exposition, 328 companies had displays in more than 500 booths.

All meeting rooms had been provided with computer-linked projectors for Powerpoint and similar presentations. It was hoped to eliminate 35mm slide projectors in the future, however overhead projectors are to be retained.

In the future, meeting programs will be bound separately, but mailed together with *C&EN*. Of course, separate programs will be available at the meetings themselves, as before.

For 2002, National Meeting preregistration fees for members will be $265.

There were some floor comments on the large distance between hotels and the Chicago Convention Center which, even with the bus shuttles provided, presented schedule conflicts. In answer, the N&E Chair pointed out that because of our meeting size, only 6 cities in the US can accommodate meetings of this size, and that the trend is to build convention centers quite far from the downtown hotel sites, something the ACS cannot control.

Project SEED reported that for 2001 there were 293 first-year and 49 second-year SEED students. From these, 33 obtained college scholarships. For 1999-2000, 66% of the SEED participants chose to become chemistry majors in college.

The following NESACS Councilors reported on committee activities:

Tom Gilbert, as Chair of the N&E Task Force on Election Procedures, met with the Constitution and Bylaws Committee to discuss bylaws changes which may become necessary if electronic voting is introduced. A draft petition may be presented at the fall meeting.

Michael Hearn, as Subcommittee Chair of the Advocacy Subcommittee of the Committee on Chemistry and Public Affairs participated in the discussion of new procedures for selecting recipients of Grassroots Achievement Awards, and new aspects of the Legislative Action Network.

Doris Lewis attended the meeting of the same parent committee. She also mounted the material for the poster "100 Years Northeastern Section", which featured the display of pictures of the 10 Nobel Laureates of the Section (an enlargement of the center-spread in the February 1998 100th Anniversary Issue of *The NUCLEUS*.). This material was presented at poster sessions of the Division of Industrial and Engineering Chemistry and the Division of Chemical Education.

Arno Heyn visited the meetings of the Constitution and Bylaws Committee and participated in the discussion of draft petitions which had been presented to the committee.

Arlene W. Light attended meetings of the Committee on Economic and Professional Affairs and together with Truman Light, worked in the Career Services department (Natl. Employment Clearing House) Sunday through Wednesday.

At the ChemLuminary Awards at the National ACS meeting in Chicago, Amy Tapper, chair of the YCC, accepted the Outstanding Local Section Younger Chemists Committee Award for the Northeastern Section YCC. This award was given in recognition of the various activities of the YCC in 2000. This is the second year in a row that the Northeastern Section YCC has won an award. http://people.bu.edu/nsycc.

L. to r.: M. Strem, Amy Tapper (YCC), M.Z. Hoffman at the Chem.Mixer/poster session.

Puzzle Column

Answer to the September puzzle

If the radius of the small circles is 1, the radius of the large circle is 3. The areas are proportional to (radius)^2, therefore 1:9 . There are seven small circles contained in the large circle, therefore the shaded area is equal to twice the area of one of the small circles.

New Puzzle

The Mensa Mind Challenge: Part I

This puzzle appeared in *American Way*, the American Airlines in-flight magazine. *Reprinted with permission of American Mensa Limited, 1229 Corporate Drive West, Arlington, TX 76006; www.us.mensa.org.*
Source: Abbie F. Salny, Ed. D., Mensa's supervisory psychologist

1. Fill in each of the blanks below with a word that means the same as the words on either side.

   (transparent) _____ (evident)
   (type of precipitation) _____ (greet)

2. The equation 143 + 586 = 729 uses the digits from 1 to 9 only once each. There are many combinations of those numbers that will produce the same result. Can you find three of them?

3. The names of three U.S. cities have been interlaced below. Can you find them? (Hint: they're in the eastern half of the U.S.)

   BTIORTSOHTYAOCNA

4. Fill in the following word square using one letter S, two each of the letters T, U and E, four letter As and five letter Rs, so that each word can be read both across and down.

S	T	A	R
T			
A			
R			

5. What is the number that is 10 more than 1/4 of 1/10 of 1/5 of 800?

(Answers next month.)

Historical Notes

Continuation of biographies of recently deceased chemists and chemical engineers

Louis W. Mead, 80, died on December 7, 2000 at his home in Lexington, Mass. after a long illness. He was a native of St. Louis and a chemical engineering graduate of Cornell University. As a member of the 4th Engineers Special Brigade during World War II he participated in amphibious landings in the Pacific theater. After the war he was employed in research at Oak Ridge, Tenn. and at M.I.T..He founded several small firms that developed radiopharmaceutical diagnostic tests, some of which are currently used by hospitals. He was the founder of the Mount Agamenticus ski area in southern Maine.

James H.Parliman died on June 15, 1999 after a short illness. He was a 1943 graduate of the Worcester Polytechnic Institute and was a longtime member of ACS. He lived in Keene, N.H. and was survived by his wife. We regret that we have been unable to acquire additional material on his career from his estate.

Marco H. Scheer, 81, died on May 11, 2000.He was a native of Manchester, N.H. and had lived in Nashua since 1947. He received the cum laude B.S. in biochemistry from Tufts College in 1940 and then began his lifelong teaching career at Nashua High School. He was a General Electric Science fellow at Union College in 1946 and in later years pursued graduate work at Boston University, Lowell Technological Institute, and Rivier College. Beginning in 1950 Marco became a well-known member of the New England Association of Chemistry Teachers (NEACT) and almost until the time of his death occupied most of the offices of NEACT as well as serving as an advisor to the summer conference program and to other activities of the Association. A complete account of his work has been published by NEACT and is available on request. For all these services he received several awards of NEACT. In addition he received the Elizabeth Thompson Award for excellence in teaching made by the American Academy of Arts and Science (1956), the Howard Wagner Award for outstanding service to science education in New Hampshire (1991) and was elected to the Aula Laudis Society of the Northeastern Section, ACS (1990).

The last named honor was for Marco's service as a teacher, but he served his professional societies as well. In addition to his services to NEACT he was also an active member of the Northeastern Section, ACS. In the 1950's when I was an officer of the Section I noted that Marco and his wife were frequently seen at Section meetings despite the tedious drive to Cambridge. I accepted his offer to serve on Section committees. At a time when active Section members from secondary schools were few Marco was outstanding. Had *Aula Laudis* then been in existence he would have been among its first members.

Sukant K.Tripathy, 48, professor of chemistry at the University of Massachusetts, Lowell, and director of its Center for Advanced Materials, drowned on December 12, 2000 while swimming in Hawaii where he was attending the Poly Millenial Conference. A full biography of Sukant has been published in *C&EN*, Jan. 22, 2001, p.116. ◇

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Activated Carbon Services Inc.

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Front Run OrganX, Inc.

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Chemir/Polytech Laboratories

75-POLYMERS
Business Development Intnl.
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Goldstein Associates

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Chemir/Polytech Laboratories
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77-R & D
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Front Run OrganX, Inc.
Goldstein Associates
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Schwarzkopf Microanalytical
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78-RADIATION PROCESSES
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CAPTAN Associates, Inc.

80-SPECTROSCOPY
Schwarzkopf Microanalytical

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CONSULTING SERVICES *Continnued*

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Business Development Intnl.
Poly(Chem-Tech)

80B-TESTING LABORATORY
Chemir/Polytech Laboratories
Micron Inc.

81-UV ANALYSIS
Schwarzkopf Microanalytical

DETECTORS

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GOW-MAC Instruments Co.

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Alpha Omega Technologies Inc.
GOW-MAC Instruments Co.

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88-ELECTRON MICROPROBE
Micron Inc.

ELECTRON MICROSCOPY

89-ELECTRON MICROSCOPY
Micron Inc.

ENVIRONMENTAL ANALYSIS

90-ENVIRONMENTAL ANALYSIS
Chemir/Polytech Laboratories
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91-ESCA SERVICES
Chemir/Polytech Laboratories

FURNITURE, LAB

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Huffman Laboratories, Inc.
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Frinton Laboratories, Inc.
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Alpha Omega Technologies Inc.
Hiden Analytical

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Calendar

Continued from page 28

"The Chemistry & Biology of Novel, Dual-Acting 5-Lipoxygenase Inhibitors and H1 Receptor Antagonists for Treatment of Asthma"
Univ. Mass. Boston, Science Building, Room 089, 4:30 pm

October 17

Prof. E. J. Corey (Harvard Univ.)
University Lectures in Chemistry 2001-2001
"Catalytic Enantioselective Synthesis: Methods, Pathways and Applications" Part Two
Boston College, Merkert Chemistry Center, Room 130, 2609 Beacon St. 4:00 pm

Prof. G. Coates (Cornell Univ.)
TBA Inorganic Chemistry Seminar
MIT, Room 6-120, 4:00 pm

Prof. D. Venkataraman (U. Mass. -Amherst)
"Copper-based Catalysts for Aryl-carbon and Aryl-Heterobond Formation"
UMass Dartmouth, Science & Engineering Building (Group II), Room 115, 4:00 pm

October 18

Dr. George Klee (The Mayo Clinic)
"Human Anti-Mouse Antibody"
Am. Association for Clinical Chemistry and the Clinical Ligand Assay Society, at
Doubletree Guest Suites Hotel, Waltham at 128
6 pm Social; 7 pm Dinner; 8 pm Lecture

Prof. Christopher Dobson (Oxford Univ.)
A.D. Little Lecture in Physical Chemistry; (Harvard/MIT) Physical Chem. Lecture
"Protein Misfolding and Its Links with Human Disease" MIT, Room 6-120, 5:00 pm (not 4 pm)

Prof. Gary E. Wnek (Virginia Commonwealth Univ.)
"Thinking Small about Old Polymers at the Medicine/Engineering Interface"
Worcester Polytechnic Institute, Dept. of Chemical Engineering,
Goddard Hall, Room 227, 4:00 pm

October 19

Prof. E. J. Corey (Harvard Univ.)
University Lectures in Chemistry 2001-2001
"Catalytic Enantioselective Synthesis: Methods, Pathways and Applications" Part Three
Boston College, Merkert Chemistry Center, Room 130, 2609 Beacon St., 4:00 pm

October 23

Prof. Xiaowei Zhuang (Harvard Univ.)
"Watching Enzymes Fold and Function One Molecule at a Time"
MIT, Room 2-105, 4:00 pm

Prof. Peter Lansbury, Jr. (Harvard Medical School and Brigham and Women's Hospital)
"The Emergence of New Therapeutic Targets for Parkinson's Disease"
Tufts Univ., Pearson Chem. Building, 62 Talbot Ave., Medford, Room 106, 4:30 pm

Prof. Carolyn Anderson (Washington Univ., St. Louis)
Topic to be announced
Univ. New Hampshire, Iddles Auditorium Room L103, 11:10 am

October 24

Prof. Dan Reger (Univ. of South Carolina)
tba Inorganic Chemistry Seminar
MIT, Room 6-120, 4:00 pm

Prof. Wilfredo Colon (Rensselaer Polytechnic Institute)
"Deciphering the 'grammatical rules' of protein folding"
UMass Dartmouth, Science & Engineering Building (Group II), Room 115, 4:00 pm

October 25

Dr. Verna Frasca (MicroCal, LLC)
"Microcalorimetric Methods for the Detection and Analysis of Biomolecules"
Am. Association for Clinical Chemistry and the Clinical Ligand Assay Society, at
West Roxbury V.A. Hospital, Research Conference Room 2B-100, 3:30 pm

Prof. Takeshi Nakai (Niigata Univ.)
Organic Chemistry Seminar Series: Organic Syntheses, Inc., Lecture
MIT, Room 6-120, 4:00 pm

October 29

Prof. Patrick Vaccaro (Yale Univ.)
"Spectroscopic Investigations of Proton-Transfer and Hydrogen-Bonding in Model Organic Systems"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

Prof. Sunny Xie (Harvard Univ.)
TBA
Brandeis Univ.,
Room Gerstenzang 122, Building Edison Lecks, 4:00 pm

Prof. Ernesto Carmona-Guzman (Universidad de Sevilla)
TBA A.D. Little Lecture in Inorganic Chemistry
MIT, Room 6-120, 4:00 pm

October 30

Dr. Takeshi Nakai (Tokoyo Institute)
TBA
Brandeis Univ., Room Gerstenzang 122, Building Edison Lecks, 4:00 pm

Prof. Ernesto Carmona-Guzman (Universidad de Sevilla)
TBA A.D. Little Lecture in Inorganic Chemistry
MIT, Room 6-120, 4:00 pm

Prof. Andrei Tokmakoff (Mass. Inst. of Tech.)
"Molecular Structure and Dynamics in Solution Observed through Two-Dimensional Infrared Spectroscopy"
Tufts Univ., Pearson Chem. Building, 62 Talbot Ave., Medford, Room 106, 4:30 pm

Prof. Iwao Ojima (SUNY Stony Brook)
"Interface of Organic Synthesis and Medicine: From Enzyme Inhibitors to Taxol"
Univ. Mass. Boston, Science Building, Room 089, 4:30 pm

October 31

Jenn Jamieson (Schrock Group)
TBA Inorganic Chemistry Seminar
MIT, Room 6-120, 4:00 pm

Prof. Donald W. Boerth (UMass Dartmouth)
"Nucleophilic Substitution Reactions by Glutathione in Chlorinated Aromatic Systems - an Ab Initio Investigation"
UMass Dartmouth, Science & Engineering Building (Group II), Room 115, 4:00 pm

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Note also the MIT Chemistry Department Webpage calendar: http://web.mit.edu/chemistry/www/temp/seminars/pchemseminars.html and the Harvard Chemistry web site for updates: http://www-chem.harvard.edu/events/Physical_Seminars.html (which includes the Harvard/MIT joint seminars)

October 1

Prof. Nicholas Farrell (Virginia Commonwealth Univ.)
"Polynuclear Platinum-DNA Interactions: New Classes of Antitumor Drugs"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

Prof. Alex Tropsha (Univ. of North Carolina)
"Computational Geometry (Delaunay Tessellation) of Proteins: From Structure to Sequence to Function"
Brandeis Univ., Room Gerstenzang 122, Building Edison Lecks,
4:00 pm

Paul Henderson (Essigmann Group, MIT)
Biochemistry Seminar "Biophysical Causes and Mutagenic Consequences of Guanine Oxidation in DNA"
MIT, Room 6-120, 4:00 pm

Prof. Joseph Helble (Univ. of Connecticut)
"Fine Particulate Air Pollution and Human Health: The Contribution of Combustion Sources"
Tufts Univ., Dept. of Chem. & Biological Engineering,
4 Colby Street, Science & Technology Center, Room 136, 11:30 am

October 2

Prof. Peter Seeberger (Mass. Inst. of Tech.)
"Automated Synthesis of Oligosaccharides:New Chemistry to Address Fundamental Biomedical Questions "
Tufts Univ., Pearson Chem. Building, 62 Talbot Ave., Medford,
Room 106, 4:30 pm

Prof. John McDonald (Worcester Polytechnic Institute)
"Design of Crystalline Materials"
Univ. Mass. Boston
Science Building, Room 089, 4:30 pm

October 3

Prof. Judith Herzfeld (Brandeis Univ.)
"Solid-state NMR Studies of the Proton Pump Cycle of Bacteriorhodopsin"
UMass Dartmouth, Science & Engineering Building (Group II),
Room 115, 4:00 pm

October 4

Prof. Dr. Peter Chen (ETH Zentrum)
Topic to be announced
Boston College, Merkert Chemistry Center, Room 127, 2609 Beacon St.
4:00 pm

Prof. R. Dean Autsmian (Univ. of Maine, Dept. of Physics)
(Harvard/MIT) Physical Chem. Lecture
Harvard Univ., MB-23 Pfizer Lecture Hall, 5 pm

Prof. Thomas J. Wandless (Stanford Univ.)
tba Seminar in Organic Chemistry
MIT, Room 6-120, 4:00 pm

Prof. Patricia Maurice (Notre Dame Univ.)
"Molecular-Scale Approaches to Organic-Matter Interactions with Mineral Surfaces"
Worcester Polytechnic Institute, Dept. of Chemical Engineering,
Goddard Hall, Room 227, 4:00 pm

October 9

Dr. Marshall Newton (Brookhaven National Laboratory)
"Mechanisms of Thermal and Optical Electron Transfer: Perspectives from Theory and Computation"
MIT, Room 2-105, 4:00 pm

Ms. Lisa Lloyd Kindstrand (U. Mass. - Boston)
Literature Seminar, "Diamonds and Dust: K/T Boundary Clay Analysis"
Univ. Mass. Boston
Science Building, Room 089, 4:30 pm

Prof. Watson L. Lees (Syracuse Univ.)
Topic to be announced
Univ. New Hampshire, Iddles Auditorium Room L103, 11:10 am

October 10

Prof. Robert Bergman (Univ. of California, Berkeley)
tba Inorganic Chemistry Seminar
MIT, Room 6-120, 4:00 pm

October 11

Dr. Robert Barrows (New England Biometrics)
"Faster Assay Development with Statistical Experimental Design"
The Clinical Ligand Assay Society, at Genetics Institute, 6th Floor,
150 Cambridge Park Drive, Cambridge,
6:00 pm (5:30 pm refreshments)

Prof. Kai Yee Lee (Univ. of Chicago)
Physical Chem. Lecture
Harvard Univ., MB-23 Pfizer Lecture Hall, 5pm

Prof. Carl R. F. Lund (SUNY Buffalo)
"An Experimental and Computational Investigation of Redox Cycles during N_2O Decomposition"
Worcester Polytechnic Institute, Dept. of Chemical Engineering,
Goddard Hall, Room 227, 4:00 pm

October 12

Prof. Dieter Seebach (ETH Zurich)
Organic Chemistry Seminar Series: Wyeth-Ayerst Lecture
MIT, Room 6-120, 4:00 pm

October 15

Prof. William Goddard (Calif. Institute of Technology)
"*De novo* Simulations of Catalysis, Materials, and Biochemistry"
Boston Univ., Science Center Auditorium, SCI 107, 4:00 pm

Prof. Christopher Dobson (Oxford Univ.)
A.D. Little Lecture in Physical Chemistry
"The Nature and Significance of Protein Folding"
MIT, Room 6-120, 4:00 pm
Opening Reception in the Moore Room, 6-321 at 5:30PM

Prof. Theresa Wood (Texas A & M Univ.)
"Using Engineering Tools to Examine Mechanisms of Amyloid Diseases"
Tufts Univ., Dept. of Chem. & Biological Engineering,
4 Colby Street, Science & Technology Center, Room 136, 11:30 am

October 16

Prof. E. J. Corey (Harvard Univ.)
University Lectures in Chemistry 2001-2001
"Catalytic Enantioselective Synthesis: Methods, Pathways and Applications" Part One
Boston College, Merkert Chemistry Center, Room 130, 2609 Beacon St. 4:00 pm

Prof. Christopher Dobson (Oxford Univ.)
A.D. Little Lecture in Physical Chemistry
"Unravelling the Mechanisms of Protein Folding Reactions"
MIT, Room 6-120, 4:00 pm

Prof. Catherine Drennan (Mass. Inst. of Tech.)
"When Bigger Isn't Better: Crystal Structure of Class II Ribonucleotide Reductase"
Tufts Univ., Pearson Chem. Building, 62 Talbot Ave., Medford,
Room 106, 4:30 pm

Dr. Ralph Scannell (Union Chimique de Belgique)

Continued on page 25

October 2001 Overflow

Book Review

***Apparatus and Acumen* Instruments and Experimentation in the History of Chemistry.** Edited by Frederic L. Holmes and Trevor H. Levere. xxii + 415 pp. The MIT Press, 2000. $50.

Reviewed by Arthur Greenberg, College of Engineering and Physical Sciences, University of New Hampshire, Durham

Reprinted by permission from *American Scientist*, **2001**, 89, 372-374.

Humphrey Davy held the early "world's record" for discovering chemical elements' six. In *Elements of Chemical Philosophy*, he modestly attributed his success to the voltaic pile – a new instrument in the chemist's armamentarium – rather than to his own acumen, stating that "The active intellectual powers of man in different times are not so much the cause of the different successes of their labours, as the peculiar nature of the means and artificial resources in their possessions."

Histories of chemistry usually trace the evolution of great ideas or the interplay between great scientists. The essays in this collection examine the evolution of the field through its apparatus. This presents an interesting challenge since, unlike the attractive and robust microscopes, telescopes and astrolabes of earlier centuries, chemical apparatus was more modest, even homely, and especially more fragile and, therefore, highly disposable and disposed of. Its more valuable parts (such as metal rings) were stripped and recycled. Thus, little ancient al chemical glassware exists today; for example, the number of true pelicans (glassware for recycling distillation) that have survived is quite small. We rely on ancient manuscripts containing highly stylized figures and on the texts of the 16th and 17th centuries, which were often stylized versions of these stylized pictures, in some cases probably describing apparatus fabricated only in the mind of the author.

Following a helpful introduction by the editors are 14 contributed chapters organized chronologically into three sections: The Practice of Alchemy; From Hales to the Chemical Revolution; and The Nineteenth and Early Twentieth Centuries. The editors also introduce each section with a brief explanatory essay. The chapters, 20 to 40 pages in length, are uniformly well written and well edited, and most are well illustrated. They are written both for chemical historians and for a more general readership, since unfamiliar terms are defined, and often the workings of unfamiliar apparatus are explained. Each chapter ends with an extremely useful summary.

The first chapter ("The Archaeology of Chemistry"), by Robert G. W. Anderson, summarizes the discoveries of fragments of ancient chemical glassware from Egypt, Arab lands, India, early Europe and Renaissance Europe. Four important early books are scrutinized for details of Renaissance chemical practices. It is both humbling and reassuring to note the relative "stability" of chemical glassware and "continuity" of change through the ages. However, Anderson cautions us not to take these texts at face value, noting that much more may eventually be learned from careful study of the archaeological fragments.

In "Alchemy, Assaying, and Experiment," William R. Newman makes a case for the very early use of the blowpipe for chemical investigations – well before its employment by Johann Kunckel in the 17th century. Quantitative accuracy in alchemical investigation, commonly unanticipated, is implied by the famous glass-cased balance in Elias Ashmole's 1652 *Theatrum Chemicum Britannicum* (The original article contains a plate in color which cannot be reproduced here). The glassware in the figure suggests alchemy, not simply the assaying or weighing of gemstones. Thus the quantitative analytical work of alchemists may have been more sophisticated than is generally assumed.

Lawrence M. Principe (in "Apparatus and Reproducibility in Alchemy"), arguing against Jungians who attribute alchemical imagery to psychic states, makes a case for precise chemical apparatus as an indicator of the reproducibility desired by chrysopoeians (alchemists devoted to making gold). Evidence includes a discussion of the symbols in the keys of Basil Valentine, presumably readily decipherable by any true adept. One very interesting feature of this chapter is Principe's experimental recreation of a "Philosopher's tree" inside a glass flask.

In "Slippery Substances," Maurice Crosland neatly explains how and why chemists were so unconcerned with gases until the work of Stephen Hales and thoroughly depicts the evolution of studies of gases through the 18th century.

Trevor H. Levere (in "Measuring Gases and Measuring Goodness") treats the long-forgotten eudiometer, initially developed by Joseph Priestley as a volumetric instrument for measuring the purity of "dephlogisticated air" as well as the "goodness of air" through reaction with nitric oxide. This instrument quickly evolved to include sparking wires and in other ways to make it suitable for testing other gaseous reactions. The illustrations of gasometers, which fed measured amounts of gases into reactions, include the elaborate apparatus of Antoine Laurent Lavoisier

Lavoisier's wealth and precision afforded him a laboratory of unrivaled apparatus. Frederic L. Holmes ("The Evolution of Lavoisier's Chemical

continued on page 30

Saltus: This page does not Print

October 2001 Overflow

Book Review

Continued from page 29

Apparatus") quotes Jan Golinski's observation that "To Priestley and his followers, expenditure on this scale was not only undesirable but reprehensible, because it foreclosed the possibility of Lavoisier's experiments being replicated by others who lacked his wealth." A key insight offered to the reader is that most of Lavoisier's great works were actually accomplished using relatively simple apparatus, often adapted or "jerry-rigged" from earlier pieces.

Bernadette Bensaude-Vincent ("The Chemist's Balance For Fluids") treats hydrometers and their cousins areometers. Thought initially to have great potential as scientific instruments, hydrometers were useful for measuring the "goodness" of wine, among other commercial liquids.

Jan Golinski ("Fit Instruments") reminds us of the important role Herman Boerhaave played in transforming the thermometer from an instrument used to quantify our senses (a "cool" breeze has the same temperature as motion-less air) into a scientific instrument both used on its own and incorporated into more complex apparatus.

In "Platinum and Ground Glass," William A. Smeaton describes Louis Bernard Guyton de Morveau's exploitation of these innovations in his portable laboratory. The agronomist Arthur Young visited Guyton in Dijon in 1789 and found "such a variety and extent of apparatus, as I have seen nowhere else." This apparatus was the standard for other such chemistry "kits" on both sides of the Channel and across the Atlantic during the early 19th century.

The final section begins with an insightful essay by Melvyn C. Usselman ("Multiple Combining Proportions") that analyzes the experimental work associated with the law of multiple proportions. John Dalton, whose experiments verified his theory, did not provide experimental support as strong as that of William Hyde Wollaston, who had no theoretical bias. The strongest experimental evidence was contributed by Jacques Étienne Bérard, who received the least recognition, because the theory was already generally accepted.

In "Organic Analysis in Comparative Perspective," Alan J. Rocke provides an excellent description of Justus Liebig's development of the Kaliapparat, which permitted the gravimetric measurement of carbon dioxide from large quantitities of organic compounds, thus revolutionizing the accuracy of carbon, hydrogen and oxygen analysis. His accounts of Liebig's interactions with Jacob Berzelius, Friedrich Wöhler and Jean Baptiste Dumas are informative and entertaining. Liebig was skeptical of Dumas's "French chemistry," but Dumas ultimately perfected the difficult analysis of nitrogen.

"Chemical Techniques in a Pre-electronic Age," by Colin A. Russell, treats the ingenious chemical apparatus designed by Edward Frankland in the latter half of the 19th century. Trying to trap the radical "ethyl," Frankland made pyrophoric diethylzinc instead and ushered in the era of organometallic chemistry.

The theme of Seymour H. Mauskopf's "Bridging Chemistry and Physics in the Experimental Study of Gunpowder" is the use of physics to determine the ballistic force of gunpowder.

The final chapter, "Laboratory Practice and the Physical Chemistry of Michael Polanyi," by Mary Jo Nye, provides a wonderfully focused description of the Hungarian Jew who left the continent in the stormy and dangerous aftermath of World War I to make seminal contributions to x-ray crystallography in Manchester in the 1920s. His poly-mathic interests led him eventually to exchange the title of professor of physical chemistry for a chair of "social studies" at Manchester.

This book is a must for all institutional libraries and for anyone even mildly interested in the history of chemistry.

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