ACS Chemistry for Life™

Chicago Section

The Chemical Bulletin

100th Anniversary 1914 – 2014

http://chicagoacs.org **SEPTEMBER • 2014**

CHICAGO SECTION AMERICAN CHEMICAL SOCIETY EDUCATION NIGHT & AACT KICKOFF FRIDAY, SEPTEMBER 19, 2014

LOCATION

Please see Chicago Section website at www.chicagoacs.org for more information.

POSTER SESSION & AACT SIGNUP **5:00 - 7:45 P.M.**

DINNER **5:00 P.M. – 6:45 P.M.**

HS SCHOLARSHIP EXAM AWARD PRESENTATIONS **7:45 P.M.**

"KICKOFF OF THE NEW AMERICAN ASSOCIATION OF CHEMISTRY TEACHERS" ADAM BOYD (BY SKYPE) **8:15 P.M.**

General Meeting **8:20 P.M.**

Register ONLINE for Chicago Section monthly meetings

www.chicagoacs.org

Don Wink, Professor of Chemistry at the University of Illinois at Chicago

"Knowing How Students Learn in Chemical Education"

Abstract: A key component of learning by chemistry students is found in the methods they use to construct their knowledge. But these methods are often unknown to teachers. Instructors can provide content, implement learning activities, and design learning environments that support student learning-things that affect where and what students learn. Testing, in turn, has the potential (not always realized) to reveal what students know. But what students actually think about and do in order to learn material-how they learn, in other words-is harder to document because it occurs out of sight of the teacher and, often, is not something even students stop to think about.

This talk will discuss research and teaching work that has been done to document, understand this "How" question and, based on the research, to support productive student learning. Two studies will be presented, one from a writing-intensive general education chemistry course and the other from a course on organic and biochemistry for allied health students. Both studies demonstrate that ongoing student assessment, in particular through reflective journals and surveys, has the potential to get students to think about and reveal how they learn, as well as how they may struggle in their learning. From this it is then possible to design new activities that promote more positive efforts by the students.

(continued on page 2)

The mission of the Chicago Section of the ACS is to encourage the advancement of chemical sciences and their practitioners.

IN THIS ISSUE

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Biography: Don Wink is a Professor of Chemistry at the University of Illinois at Chicago, where he has taught since 1992. He has been on the faculty of UIC's Learning Sciences Research Institute since 2004, and has been its Director of Graduate Studies since 2007. He is currently Chair of the American Chemical Society's Division of Chemical Education, for which he was Secretary and Councilor from 2005-2010, and serves on the editorial advisory board of the prestigious Journal of Chemical Education. In 2014, he was named a Fellow of the American Chemical Society, honoring his contributions to the ACS as well as those to science and education. He work has partly focused on the general chemistry undergraduate curriculum, including NSF-supported materials development projects that led to a textbook (The Practice of Chemistry) and a project-based laboratory manual (Working with Chemistry). He was a co-PI for the Center for Authentic Science Practice in Education, giving first- and second-year students research opportunities within the regular lab curriculum. In 1999 he began several projects involving K-12 teacher preparation and education. This included work in conjunction with the UIC College of Education and area community colleges on new general education courses for elementary education majors. He worked on several STEM projects in the Chicago Public Schools (CPS), in particular a curriculum and professional development project with Loyola University Chicago for 11 high-need schools, over a hundred faculty (about one-third chemistry) and about 20,000 students. He is also engaged in collaborative work with department colleagues in the area of small molecule crystallography.

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NOTICE TO ILLINOIS TEACHERS

The Chicago Section ACS is an ISBE provider for professional development units for Illinois teachers. Teachers who register for this month's meeting will have the opportunity to earn CPDU's.

"CHEM SHORTS" For Kids

The Primary Education Committee of the Chicago Section ACS presents this column and hopes it will reach young children and help increase their interest in science. Please print it out and pass it on to your children, grandchildren, or elementary school teachers. Teachers are encouraged to incorporate the projects in this column into their lesson plans.

Ice Art

Kids, make a colorful ice sculpture while learning about freezing point depression. All you need is ice, salt, and food coloring! You can use any type of salt. Coarse versions like rock salt or sea salt work great, as does the finer-grained table salt (all of these are sodium chloride, NaCl). You can even use other salt compositions like Epsom salts (magnesium sulfate, $MgSO_4$). For colors use water-based paints such as watercolors or tempera paints, or food coloring.

What To Do

1. Make ice. You can use ice cubes but larger pieces of ice are better. Freeze water in shallow plastic, disposable storage containers. Fill them only part way to make relatively thin pieces of ice. This is because the salt can melt holes all the way through thin pieces, making interesting ice tunnels.
2. When you're ready, remove the blocks of ice and place them on a cookie sheet or in a shallow pan. If the ice doesn't come out easily, run warm water around the bottom of the container.
3. Sprinkle salt onto the ice or make little salt piles on top of the ice. Experiment!
4. Dot the surface with coloring. The coloring doesn't color the frozen ice, but it follows the melting pattern. You'll be able to see channels, holes, and tunnels in the ice, plus it looks like art work.
5. You can add more salt and coloring, or not. Explore however you like.
6. NOTE! This is a messy project. You should perform it outdoors or in a kitchen or bathroom. The coloring will stain hands and clothes and surfaces.

How It Works

The salt lowers the freezing point of water through a process called **freezing point depression**. The ice starts to melt because it is above its freezing point. It makes liquid water. Salt dissolves in the water, adding ions that increase the temperature at which the water could refreeze. As the ice melts, energy is drawn from the water, making it colder. Salt is used in ice cream makers for this reason. It makes the ice cream cold enough to freeze. Did you notice how the water feels colder than the ice cube? The ice exposed to the salty water melts faster than other ice, so holes and channels form.

from Anne Marie Helmenstine
http://chemistry.about.com/od/chemistryactivities/a/Melting-Ice-Science-Experiment.htm

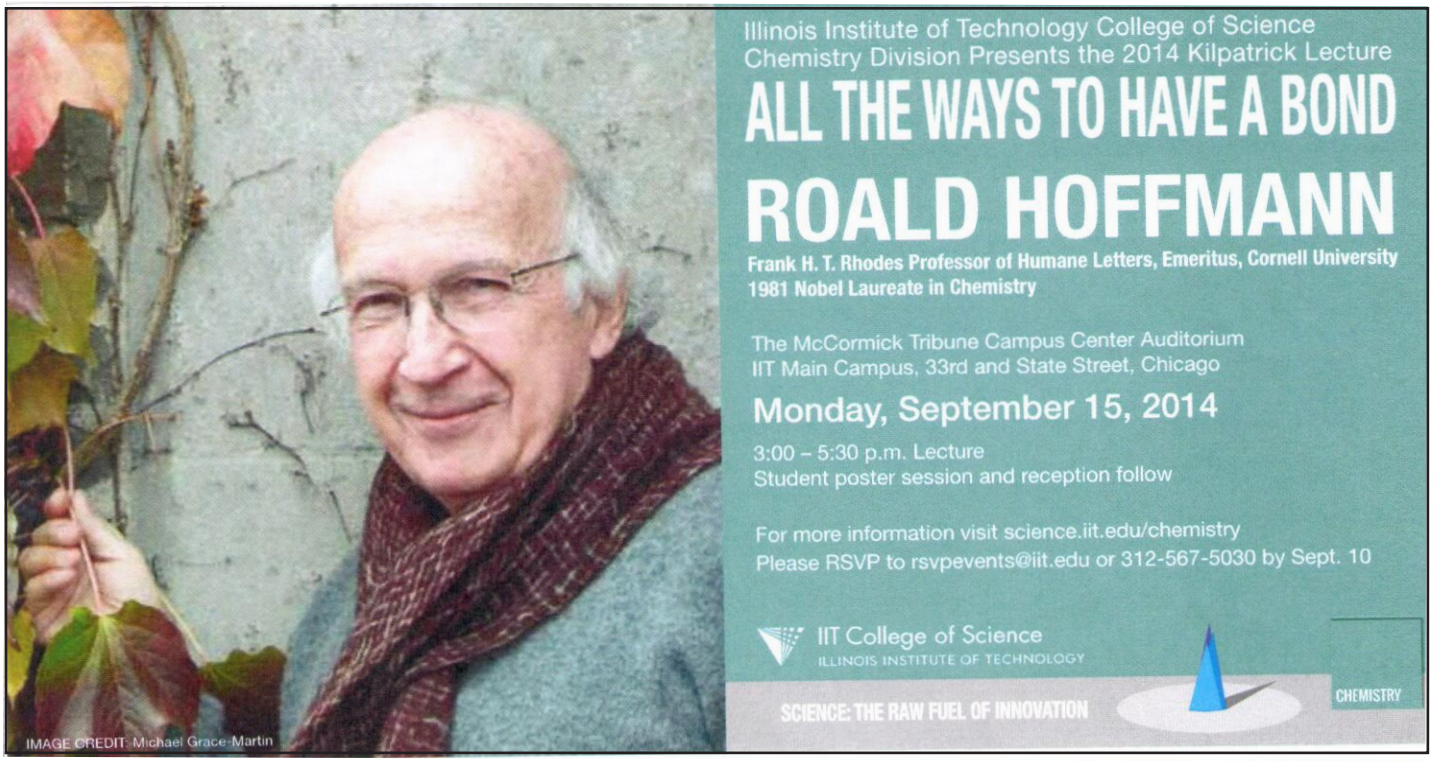
Submitted by DR. KATHLEEN CARRADO GREGAR

To view all past "ChemShorts for Kids", go to:
http://chicagoacs.org/articles.php?article_category=1

FREE CHEMMATTERS RESOURCES

Free ChemMatters magazine resources are available at: **www.acs.org/chemmatters**

- **Teacher's guides** (with extensive background information about the articles, laboratory activities, questions pertaining to the articles, and reading and anticipation guides created by our reading specialist)
- **Animated video podcasts**, which provide visual support of chemistry concepts discussed in the articles
- "**News You Can Use**," an online section that highlights topics that recently appeared in the news and are related to high school chemistry concepts



2014 FIFTY-EIGHTH ANNUAL SCHOLARSHIP EXAMINATION IN CHEMISTRY

SPONSOR: Chicago Section, American Chemical Society: High School Education Committee
HELD AT: North Central College on May 31, 2014
AWARDS: Funds are contributed by the chemical industry and by individuals.
Teachers of a prize-winning student(s) will receive $100.

PRIZE	WINNER	SCHOOL & TEACHER
$5,000 AWARD	Samuel Detmer	Walt Kinderman Walter Payton College Preparatory HS
SECOND $3,000 AWARD	Douglas Stryker	Jim Glynn Glenbrook South HS
THIRD $2,500 AWARD	Conrad Brenneman	Cheryl Rulis Oak Park-River Forest HS
FOURTH $1,500 AWARD	Arjun Rawal	Cheryl Rulis Oak Park-River Forest HS
FIFTH $1,250 AWARD	Bethany Simos	Steve Wiesbrook Naperville Central HS
MARIE LISHKA * $2000 AWARD	Bethany Simos	Steve Wiesbrook Naperville Central HS
MARSHALL S. SMOLER** **$200 AWARD**	Samuel Detmer	Walt Kinderman Walter Payton College Preparatory HS
BERNARD E. SCHAAR*** **$500 Chicago Chemists' Club Award**	Samuel Detmer	Walt Kinderman Walter Payton College Preparatory HS

*To the highest scoring female in the examination. This award honors Marie Lishka, who was an active Chicago Section member for many years. Additional funding for the Lishka award was provided in memory of Stan Drigot.
**To the highest-scoring Chicago Public High School Student. His sister, Rachel, established this award in 1972 in memory of Marshall S. Smoler. Mr. Smoler was for many years a chemistry teacher in the Chicago public schools.
*** To the highest scoring Chicago High School student. Mr. Bernard Schaar's widow established this award in memory of Mr. Bernard Schaar, long active in Chicago Section, American Chemical Society and the Chicago Chemist's Club.

HONORABLE MENTIONS LISTED IN ALPHABETICAL ORDER
(These students were the next highest performers)

Kevin Derby	Harry D. Jacobs HS
Amy Liu	Naperville North HS
Vinayak Ahluwalla	Glenbrook South HS
Brandon John	Naperville Central HS
Michael May	Walter Payton College Prep HS
Matthew Zurek	Highland Park HS
Rick Li	Naperville Central HS
Abigail Preiwisch	Harry D. Jacobs HS
Tim Pan	Naperville Central HS
Jacqueline Ehrlich	Niles North HS
John Waldron	Barrington HS

A total of 69 students took the 2014 ACS Scholarship exam. Each chemistry teacher could nominate two students.

Awards will be given to students at the ACS Education Night meeting at a time, date, and place to be determined. Award winners and their teachers will be contacted by the Chicago ACS office. All teachers and students are invited and encouraged to attend the ACS Education Night meeting. Teachers who attend the ACS Education Night meeting will receive CPDU credits. Teachers do not have to be ACS members to attend. Register online at **https://chicagoacs.org/meet-reg1.php?id=70.**

A special thank you to Dr. Paul Brandt, Chemistry Professor at North Central College, for his hard work and willingness to author the exam.

FINANCIAL CONTRIBUTORS TO THE SCHOLARSHIP EXAM ARE: ACS Chicago Section, Stan Drigot, Dr. Henry M. Walton, Chicago Chemists' Club, and Rachel Smoler.

WCC COLUMN

Members of the Chicago Section's Women Chemists Committee (WCC) are developing outreach plans for Chicago Area section members and the community. These plans include the following column in The Chemical Bulletin covering topics such as networking, career development, and vignettes of women in science, particularly chemistry. This month's topic is about **Ms. Stephanie Kwolek**.

Ms. Stephanie Kwolek, a Lady to Remember

"I seem to see things that other people do not see." These are the words of Ms. Stephanie Kwolek, a DuPont chemist, who recently passed away on June 18, 2014 at the age of 90. Ms. Kwolek's pioneering spirit and enthusiasm for science, and in particular, chemistry, made her a champion as well as a mentor in her field.

Ms. Kwolek was born in New Kensington, Pennsylvania. Unfortunately, her father passed away when she was ten years old, but her curiosity for the world around her was cultivated through her father's love of nature, especially the woods and the fields. From her mother, she inherited the love of sewing, and at one time entertained the idea of becoming a fashion designer. However, her curiosity and attention to detail led her to pursue an education at Margaret Morrison Carnegie College of Carnegie-Mellon University. It was here that her interest in chemistry blossomed into what would turn out to become a career of outstanding research achievements and creativity.

After Ms. Kwolek graduated from the university, her economic situation required her to postpone her much desired entrance into medical school and instead take a research position at DuPont. Consider that when she was beginning her career in the 1940s, the employment situation in America was not an easy one for women. There were few women hired and employement was offered only because men were at war or just returning from their service. As men regained entry into the workforce, women scientists and especially those with a Ph.D. worked for a couple of years and then pursued a teaching career. By comparison, Ms. Kwolek remained working at DuPont, and was so enthralled with her work that she decided to forgo her plans to enter medical school. She eventually move to DuPont's Pioneering Lab in Wilmington. Even though at that time there were biases against women in her field, the group of male scientists she worked for encouraged her to use her ingenuity and to continue to flourish in her work.

Consequently, Ms. Kwolek became engaged in several projects. Remember that DuPont was the birthplace of the nylon fiber, and the goal of DuPont was now to search for polymers and lower-temperature condensation processes that would create a specialty fiber that would ultimately produce a lighter and more fuel-efficient tire. This search would not only include the need for new polymers, but also, a new condensation process that would take place at lower temperatures – about 0°C to 40°C. By contrast, the melt polymerization process in preparing nylon was done at more than 200°C. The desired lower-temperature polycondensation processes, which used fast reacting intermediates, would make it possible to create polymers that would not melt or only begin to decompose at temperatures of above 400°C. Ms. Kwolek's research involved preparing intermediates, synthesizing aromatic polyamides of high molecular weight, dissolving the polyamides in solvents, and through much coaxing on her part the spinning of solutions into fibers. By chance, Ms. Kwolek discovered that under certain conditions large numbers of the molecules of these rod-like polyamides lined up in parallel and formed liquid crystalline solutions. The American Chemical Society says, "Most researchers would have rejected the solution because it was fluid and cloudy rather than viscous and clear, but Ms. Kwolek took a chance and spun the solution into fibers that were more strong and stiff than ever have been created." Ms. Kwolek's 1965 discovery was the highlight of an already distinguished career.

Furthermore, this unprecedented 5x stronger than steel aramide fiber and material was registered as Kevlar and was commercially used in the early 1970s. This miracle fiber is resistant to wear, corrosion and flames, and it is the primary ingredient of bullet proof vests and body armor which have become the attire of legions of and law enforcement officers. It is also found in boats, planes, ropes, cables, tennis rackets, skis, and countless other applications. Ms. Kwolek was particularly proud of its overall effectiveness as a safety measure.

As a result of her accomplishment and her 40 years of service at DuPont, Ms. Kwolek received numerous awards for her invention of the technology behind Kevlar fiber, including the Lemelson-MIT Lifetime Achievement Award and the National Medal of Technology. She was also inducted into the National Inventor's Hall of Fame, and the National Women's Hall of Fame and the Plastics Hall of Fame at the National Plastic Center and Museum. The Perkin Medal was presented to her by the American Section of the Society of Chemical Industry. Ms. Kwolek was an emerita member of ACS, having joined in 1947.

A final consideration is that Ms. Kwolek's success was due to her ability to envision something new, something better, and to persevere when there were hurdles that seemed insurmountable. She exemplified a mindset that believed that when goals were met, it was time to take on new challenges. Her strong work ethic coupled with her ability to think outside the box and envision ideas that could not have been seen by others were the factors that led to her discovery of Kevlar, a product used every day and that save lives.

ILANA LEMBERGER

SECTION MEETING DATES 2014

Friday, September 19
Friday, October 10
Thursday, November 20
Friday, December 5

THE BULLETIN GOES TO HIGH SCHOOL

Editorial Comment in the September 1954 issue (60 years ago) – by the editor Robert N. Feinstein

This issue of the BULLETIN is the first of ten issues to be sent gratis to interested chemistry teachers in high schools of the Chicago area. This action represents a joint effort of the part of the Education Committee and the BULLETIN to give high school chemistry teachers who for one reason or another are not members of the Chicago Section an idea of the Section activities and an opportunity to participate therein. The importance of the high school chemistry teacher in the development of the next generation of chemists can hardly be overemphasized, and we hope this gift will be welcomed by, and of interest to, many of the group.

CHEMISTRY OLYMPIAD FINALISTS TAPPED TO ATTEND STUDY CAMP

The **U.S. National Chemistry Olympiad (USNCO) Program** is proud to announce the 20 finalists who attended the Chemistry Olympiad Study Camp, June 3-18, 2014, at the U.S. Air Force Academy (USAFA), in Colorado Springs, CO. The students competed for a spot on the team representing the United States at the 46th International Chemistry Olympiad in Hanoi, Vietnam, July 20-29, 2014.

The 20 finalists - 16 boys and 4 girls, representing 17 ACS local sections and 13 states - are:

- Soorajnath Boominathan, Oklahoma School of Science and Mathematics, OK, Oklahoma Section
- Bryce Cai, Barrington High School, IL, Chicago Section
- Adit Chandra, Carmel High School, IN, Indiana Section
- Andrew Chen, West Windsor Plainsboro High School South, NJ, Trenton Section
- Steven Cheng, Troy High School, MI, Detroit Section
- Rueih-Sheng Fu, Arcadia High School, CA, Southern California Section
- *Robert Kao, Edwin O. Smith High School, CT, Connecticut Valley Section
- *Stephen Li, Troy High School, MI, Detroit Section
- Janice Ong, Thomas Jefferson High School for Science and Technology, VA, Chemical Society of Washington
- Stephanie Ren, Princeton High School, NJ, Princeton Section
- Siddharth Seethepalli, Seven Lakes High School, TX, Greater Houston Section
- Karan Singhal, Herricks High School, NY, New York Section
- *Derek Wang, North Allegheny Senior High School, PA, Pittsburgh Section
- David Wang, Monta Vista High School, CA, Santa Clara Valley Section
- Richard Wang, North Hollywood High School, CA, Southern California Section
- Junyu Yang, Troy High School, CA, Orange County Section
- Yue Zhang, DuPont Manual High School, KY, Louisville Section
- Megan Zhao, Brecksville-Broadview Heights High School, OH, Cleveland Section
- Willie Zhu, Carmel High School, IN, Indiana Section
- Zuo, Amity Regional High School, CT, New Haven Section

* Students who participated in *2013 USNCO Study Camp*

At the Study Camp, the students were mentored by faculty of the Department of Chemistry of the USAFA, and the following mentors:

- Dr. Melissa Barranger Mathys, Ursuline College, OH, College Mentor
- Ms. Amiee Modic, Katy High School, TX, High School Mentor
- Dr. Michael Danahy, Bowdoin College, ME, College Mentor
- Mr. Jacob Sanders, Harvard University, MA, Peer Mentor

Please join us in congratulating all the finalists and the ACS local sections that support them!

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PLEASE VOTE in the Section's online election when you receive your special election password in the mail

THE AMERICAN ASSOCIATION OF CHEMISTRY TEACHERS (AACT)

Serving K–12 teachers of chemistry everywhere, AACT will offer specialized chemistry teaching resources, a periodical about teaching chemistry in the K–12 classroom, an online community for sharing strategies, and more! Please visit **http://www.acs.org/content/acs/en/education/educators/aact.html**

REMEMBRANCES OF THINGS PAST

Twenty-five Years Ago

The Chemical Bulletin celebrated its 75th Anniversary. In the October 1989 issue, there was an article written by Ellen Cozzens, production manager of The Chemical Bulletin. Here is a slightly edited reprint of that article.

My Years With The Bulletin 1946-1979

Over 500 new members joined the Chicago Section between 1945 and 1946, increasing the work load in the Section office to the extent that a third employee was needed. I was hired to help the Employment Committee Chairman run the free employment service and to assist the Editor and the managing Editor of the CHEMICAL BULLETIN. At that time the section shared space with the Chicago Chemists' Club in the Pure Oil Building. Walter Guthmann was the Editor and Bernard Schaar the Managing Editor. Founding Editor Otto Eisenchiml, as well as Carl Miner and E.H. Volwiler (both early Editors), were still active and available for advice and counsel. The size was six by nine inches, printing was by letterpress, and we could use color on the cover. There was enough local and national advertising to underwrite printing and mailing costs and to insure a minimum 32-page issue, half editorial, half advertising.

At that time the masthead included the slogan, "A Free Chemical Press, For Chemists, To Better Their Status." All of us took that slogan very seriously. The Editors staunchly withstood all attempts to influence or control editorial policy – from advertisers, from the National office, even from the Section Board. Emphasis was on the individual chemist, the Editors deeming that national scientific periodicals covered chemistry itself better than we could locally and that large corporations and other institutions didn't need our help in the public relations.

Advance notice of section meetings and details of current meetings were then, as now, given priority. Otherwise content was entirely the prerogative of the Editor and staff. Among regular features were Chicago and Cooperating Section News columns. In the area there were 16 local ACS sections whose memberships were not large enough to support their own publications, so Cooperating Section News printed news of their local members and meetings. In the Chicago Section, companies employing more than five Section members each had a "reporter" who submitted news about promotions, new employees, papers presented or published, and personal news such as marriages, births, even vacations abroad, sabbatical leaves, etc. The Chicago Section News editor re-worked these items into a column that usually covered several pages; items about members not associated with larger organizations were printed at the beginning of each column.

The editors I served were Walter Guthmann, Ed Gordy, Mary Alexander, Barbara Miner Parker, Harry Whitmore, Bob Feinstein, John Pomeroy, Charles Stevens, Tom Kucera, Ken Broome, Stan Cash, Lou Lerner and Tom Whaley. Each left his/her own mark on the publication, but what they had in common was a strong commitment to the individual chemist and to high editorial standards. Sloppy syntax was not tolerated, human interest and humor were.

For many years news stories from Loco Chemical Company appeared under Chicago Section News. Loco was invented by a group of irreverent members in a large pharmaceutical lab. It enlivened, and sometimes mystified, our readers, inspired posters at Poster Sessions and booths at the National Chemical Exposition. Stimulated by the antics of this "company," John Pomeroy prepared an insert for the National Chemical Exposition meeting issue, which he called "Comical & Enduring News". This sorely tried the patience of some of the ACS publications staff and highly entertained the rest of them – and us.

Both Editor Feinstein and Editor Pomeroy were enlisted through a limerick contest inaugurated by Editor Parker and judged by Joel Hildebrand and Carl Miner. Editor Pomeroy got his friend Issac Asimov to serve as Galactic Correspondent for a number of years. A book review column was started by Editor Charles Stevens; only books by Section members, whether scientific or not, were accepted.

Originally, the Managing Editor was responsible for arranging for printing and for getting advertising. Bernard Schaar, who had much to do with the success of the early Bulletin as well as of the Section itself, held that position when I started but was succeeded briefly by his nephew, Ed Schaar. John Rovey then held the post from 1948 to 1954, making it possible to publish issues averaging 44 pages and going as high as 64 for special meeting issues. He was followed by Payne Heimbrodt, then by Dick Eberhardt, Jack Pracht, Bob Reinarts, and R.E. Baker. During this period advertisers, particularly those who contracted for "institutional" ads to support the local publication, became harder to sign up.

In 1964, former Editor Dave Klein accepted what was by then a pretty thankless job, but he stayed on until 1971, when it was decided, in the interest of economy, to go to the present size and change to offset printing. Dick Silha took over in 1972, followed by Delores Kenney, the title was changed to Business Manager, and when I retired in 1979, Gayle Marks, was valiantly trying to get enough advertising to maintain an 8-page book.

Over the years, the Section has been very fortunate in having men and women of high literary as well as professional standards as Editors, and of acute business acumen as Managing Editor/Business Managers. The tradition survives, even though there is much less latitude because of space limitations. May the good work continue, and "may your tribe increase!"

ELLEN COZZENS, 1989

CALENDAR

September: A Younger Chemists Committee (YCC) event, Meet the Neighbors, a "speed-networking" event to showcase the chemistry being done by local chemists within YCC, followed by a networking social hour. Further information as the date is set. Contact Beau at **pwangtrakuldee@niu.edu** or Alyssa at **ajavestro@u.northwestern.edu** for details.

September: A Younger Chemists Committee (YCC) event, "Future Faculty Workshop." Further information as the date is set. Contact Beau at **pwangtrakuldee@niu.edu** or Alyssa at **ajavestro@u.northwestern.edu** for details.

September: A Younger Chemists Committee (YCC) event, "Fall Fellowships Digest." Further information as the date is set. Contact Beau at **pwangtrakuldee@niu.edu** or Alyssa at **ajavestro@u.northwestern.edu** for details.

CHEMISTRY MENTORS NEEDED IMMEDIATELY FOR BOY SCOUTS OF AMERICA CHEMISTRY MERIT BADGE PROGRAM!!

The Chicago Section of the American Chemical Society is currently seeking volunteers for its Boy Scout of America's Chemistry Merit Badge program. We need individuals to join us for lunch (noon to 2 p.m.) on either Saturday, October 1 at North Central College in Naperville; Saturday, October 18 at College of Lake County in Grayslake; or Saturday, October 25 at Oakton Community College in Des Plaines to discuss their chemistry career. Volunteers can be either active or retired chemists or chemical engineers in the industrial, government or academic sectors or be a graduate student. Scouts will be divided into small groups of 4 to 5 scouts per table during lunch. Volunteers are asked to describe their career and general information about careers in chemistry including educational requirements. Lunch consisting of cheese pizza, dessert and beverage will be provided. We are seeking at least ten volunteers at each location. Additional information about each location will be sent to volunteers that sign up for this activity. Please contact Fran Kravitz immediately at **fk1456@sbcglobal.net** if you are available to help with this very valuable educational Chicago Section program. We need to make sure that we have enough volunteers at each location. Please put "BSA Chemistry Merit Badge Program" on the subject line.

ADVERTISING INDEX

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CALL THE SECTION OFFICE AT 847-391-9091 TO RECEIVE GREAT CHEMICAL BULLETIN ADVERTISING VALUES

FREE T-SHIRTS

The Hospitality Committee raffles one T-shirt at each monthly dinner meeting. The shirt has **CHICAgO** spelled out using the periodic table. So come to a monthly meeting and maybe you'll win one!