THE OCTAGON

Volume 86, No. 7, October 2003 Lehigh Valley Section of the American Chemical Society

In This Issue:

767th LVACS Meeting:

Date: Thursday, October 16
Location: Lehigh University
Reception: 5:30 pm, Faculty Lounge, 3rd Floor University Center [Sponsored by Mallinckrodt Baker, Tyco Specialty Products]
Dinner: 6:00 pm, University Center, 3rd Floor, Asa Packer Dining Room
Meeting: 7:15 pm, Osborne Room, 3rd Floor Univ.Center
Talk: 7:45 pm, Osborne Room
Menu: Chicken Oscar (with crab meat and asparagus), Grilled Lime-Marinated Flank Steak with Chipoite Honey Sauce, or Vegetarian (roasted vegetables in a lattice puff pastry). [Chocolate samples provided by Just Born, Bethlehem, see http://www.justborn.com/]
Cost: $20.00, students $10.00
Contact: Please call Jane Derbenwick at (610) 758-3470 or e-mail rd0b@lehigh.edu by noon, Monday, October 13th. Please give your name, affiliation, and choice of dinner entrée.
Directions: directions are available at http://www3.lehigh.edu/about/lumapsdirections.asp

Speaker: Dr. Joe Vinson
Talk: Joe Vinson was born in Arkansas and grew up in the San Francisco Bay area. He attended college at the University of California at Berkeley, where he received his B.S. in chemistry in 1963. He received a M.S. degree (in physical organic chemistry) at Iowa State University in 1966. He received a research assistantship at the Ames Lab of the Atomic Energy Commission at Iowa State and received a Ph.D. in organic and analytical chemistry in 1967 under the direction of Dr. James Fritz. After several teaching positions in Pennsylvania and a two-year stint in industry at J. T. Baker Chemical Company, he returned to academe and is now a professor of chemistry at the University of Scranton. His research interests are wide-ranging and include drug analysis in physiological fluids and the effect of vitamins, minerals, and antioxidants on nutrition and health.

Abstract: Food and beverages derived from cocoa beans have been consumed by humans for 1500 years, and the beverage was originally used as currency and in religious rites by the Mayans and Aztecs. A short history of chocolate will give some perspective to the science of chocolate. Cocoa pods from the cacao tree Theobroma cacao are harvested and the beans removed from the pods and fermented. Dried and roasted beans contain about 300 chemicals including unique fats, alkaloids, and simple and complex polyphenols. The manufacturing process results in the production of the various types of chocolate including white chocolate, milk chocolate, dark chocolate, and cocoa powder. Chocolate is purported to have aphrodisiac properties and one ingredient acts on the cannabinoid (marijuana) receptor. Chocolate's antioxidant properties will be outlined and compared with other foods. How chocolate's fat and antioxidants are related to heart disease will be discussed in terms of epidemiological, animal, human supplementation, and mechanistic studies. Recent animal and human studies will be described to determine whether chocolate should be considered a guilt-free food.

2003-2004 Meeting Schedule

November 19 - East Stroudsburg University
January - Albright College
February - Kutztown University
March - DeSales University
April - Moravian College

September Meeting Minutes:

The 766th meeting of the LVACS was called to order by Chair Paul Bouis at 7:27 PM on Wednesday, September 24, 2003. Muhlenberg College hosted the event. Dr. Bouis welcomed everyone back from the summer break, and hoped that all were able to see the student's posters on display during the social hour. Chair-Elect Steve Weiner also acknowledged the excellent job done by the students. The business items discussed prior to the talk are as follows:

Dr. Bouis introduced the current LVACS Officers

Position	Name
Chair	Paul Bouis
Immediate Past-Chair	Joe Sherma
Chair-Elect	Steve Weiner
Secretary	Tara Baney
Treasurer	John Freeman
Councilor	Pam Kistler
Councilor	Roger Egolf
Alternate-Councilor	Carol Baker Libby
Alternate-Councilor	Michelle Jones-Wilson

The October Octagon will contain ballots for the upcoming election. The nominees are:

Chair-Elect: Tara Baney
Secretary: no nominees as of this write-up
Treasurer: John Freeman (with a change in the by-laws)
Councilors: Roger Egolf and Carol Baker Libby

No additional nominations were announced at this meeting. If anyone is interested in running for an office or nominating someone, please contact Carol Libby as soon as possible. As always, please read the instructions for voting carefully. Mailed Octagon issues will include a return envelope; those who receive only the electronic version must supply their own envelope. As stated in the by-laws, ballots are due to the Secretary by 31-October-2003.

Regarding terms of office, the by-laws state:

Section 3. Terms of Office: All officers, except Councilors and Alternate Councilors, shall serve for one year and shall enter upon their duties on the first day of January next following their election and shall continue in office for the term to which they have been elected or until their successors have duly qualified. ***All officers, except Councilors and Alternate Councilors, shall be limited to two terms of consecutive service in one office****. The Chair-Elect shall automatically advance to the chairmanship upon expiration of his term as Chair-Elect.*

A proposal was introduced to modify the term limit as John Freeman would be serving his third consecutive term of service as Treasurer.

John Freeman presented the Treasurer's Report. At the 5/8ths point of the year our current income to expenditures ratio stands at ($3177.00). Our planned deficit as of this printing is ($2735.63) out of a total deficit of ($4377.00). The National organization will provide us with ~$1600 towards this deficit. The net deficit will be approximately ($1600). Savings arose from the donation of the Merck Indices for student awards (~$600), and lower Octagon publication costs (~$1200 less than expected). The checking account balance was $2798.77, the scholarship balance was $1553.81, and the ready assets were $29,788.86.

The May minutes were approved with no changes. Paul announced the Foundation in Chemistry Award recipient, Angela Marie Bollinger. Angela is a freshman at DeSales University, and will attend a future section meeting to update us on her academic adventures. Paul also announced nominees are wanted for the Northeast Section of the ACS Gustavus John Esselen Award. This is a $5000.00 award, and nominations are due by 15-October-2003. Please see Paul for additional information.

Next, Paul told the attendees of our National review. The reviewing committee noted that our section is medium to large with ~ 958 members, and overall we are in good shape. Our website is impressive, more advanced than most, but we do need to increase participation at meetings as well as on our committees. Steve mentioned that we have a Publicity Chair, Dr. Christian Hamann, Assistant Professor of Chemistry at Albright College. Letters were sent to new local section members and those members who did not renew, based upon comparison of the two most recent membership lists. Each committee, as listed in the by-laws, was explained in the letters to encourage participation. Additional ideas for participation are welcomed.

Two local compatriots have passed away over the summer. The complete obituaries are in the 21-July-2003 issue of

Chemical & Engineering News.

Geoffrey R. Buckwalter, a retired chemist recognized as a leading expert in pigments and inks, died on April 5. He was 85. Buckwalter graduated from Lafayette College, Easton, Pa., with a B.S. in 1939. He went on to earn an M.S. from New York University, and, in 1950, a Ph.D. from Rutgers University in New Jersey. **Frederick C. Strong III**, a retired chemistry professor, died on March 3 at the age of 85. Born in Denver, Strong conducted all his collegiate studies in Pennsylvania, earning a B.A. from Swarthmore College in 1939, an M.S. from Lehigh University in 1941, and a Ph.D. from Bryn Mawr College in 1954. From 1940 to 1945, Strong worked as a chemist at Superior Metal Products Co., Lea Manufacturing, and Enthone. He was also an assistant at Wesleyan University in Connecticut from 1943 to 1945. Deciding a career in academia suited him better than industry, Strong became an instructor in chemistry at Cedar Crest College in Allentown, Pa. After two years, he joined the chemistry department at Villanova University. In 1951, he became an assistant professor of chemistry at Stevens Institute of Technology, Hoboken, N.J., where he stayed for nine years, working his way up to associate professor. While with the institute, Strong became the second editor-in-chief of *Applied Spectroscopy*.

The question of the month was "What Nobel Prize winning Chemist entered the study of Chemistry because his father deemed him "too stupid to be a business man"? The family business was lumber. The answer is Emil Fisher.

Roger Egolf & Pam Kistler gave the Councilor's Report from the September National meeting in New York, and submitted the following for the minutes:

> The council meeting in New York was unusually free of controversy, but there were several topics of interest under discussion. The topic most of interest concerns the Society's finances which remains sound. The picture is not as gloomy as was presented to us at the last council meeting. The ACS ended 2002 with a net deficit of approximately $790,000. This net deficit was actually about $500,000 less than projected. The deficit is primarily due to losses in advertising revenue and investment income, both of which are attributed to the country's weak economy. These losses were partially offset by increases in income from the Chemical Abstract Service and the Member Insurance Program as well as significant savings in staffing and administrative costs.
>
> The other major topic of discussion concerned the AIChE. Our Board of Directors has set up a task force to work out the details of a merger of the AIChE with the ACS. At first, the AIChE wanted to retain its own governance structure, but our Board was strongly against the proposal. The task force is now considering how the AIChE might become a Division of the ACS.
>
> You may know that the Society's Chief Executive Director, John K. Crum, is retiring at the end of the year. The Society's search committee expects to select a new CEO by mid-November.
>
> The National Employment Clearinghouse is now fully on-line, allowing employers and job seekers to interact directly on-line. The bad news in this area is there were many fewer job offerings than job seekers.
>
> The theme for the 2003 National Chemistry Wee, October 19-25, is "Earth's Atmosphere and Beyond." The theme for 2004 will be "Health and Wellness."
>
> The Membership Affairs Committee has made a proposal to amend our by-laws to help pre-college teachers attain regular membership. The proposal offers the regular membership category to any pre-college teacher who is qualified to teach chemistry under the laws of their own state and who has three years experience teaching chemistry. The Membership Affairs Committee also reports that the newly offered Auto Insurance program is doing very well and is especially popular with our younger members.
>
> The Chemical Safety Committee has revised our laboratory safety manuals. Single copies are available free on-line at http://chemistry.org/committees/ccs.

In addition to the above submitted statement, Pam, Roger, and Paul discussed the financial turmoil of the AIChE (approximately $8 million in debt). The task force is on a 30-day fast track to determine the fate of collaboration between ACS and AIChE. In addition, Roger mentioned the new initiative of Division and Local Sections planning meetings and events jointly. This will help expand volunteerism, and prevent all financial burdens going to one area. If anyone is a member of a particular division, feel free to look into activities and events for local / division collaborations.

The speaker for the evening was Dr. Neil Marsh, and his title was "The Good News about Free Radicals: How and Why Enzymes make Radicals." Dr. Marsh began by thanking everyone for the invitation to speak. He then began the overview of radical chemistry, specifically showing the ribbon diagram of Vitamin B_{12}, the main focus of the talk.[1]

Dr. Marsh showed some examples of radical chemistry in biological systems, such as ribonucleotide reductase (the reduction

of RNA to DNA), benzylsuccinate synthase (enzyme to digest toluene in bacteria), etc. The main goal of his laboratory is to learn new chemistry through the analysis of such enzymes. In addition, other enzymes such as diol dehydrase, lysine-2,3-aminomutase, and 2-methyleneglutarate mutase demonstrate the amazing ability of such molecules to make and sustain radicals. Using these examples, Dr. Marsh diagramed three types of reactions which can create radicals in biosystems: Reductive, Oxidative, and Homolytic.

Glutamate mutase, using adenosylcobalamin (AdoCbl, a biologically active form of Vitamin B_{12}), catalyzes the reversible isomerization of L-glutamate and L-*threo*-3-methylaspartate. The reaction is an unusual 1,2-rearrangement whereby an electron-withdrawing group is interchanged with a hydrogen. The migrating group is a carbon-containing fragment; therefore, a skeletal rearrangement results.[2]

The critical component of this reaction is the cobalt moiety, and one can also view the dependent isomerization that occurs. This reaction in the enzyme occurs approximately 10x every second, and Dr. Marsh's group carried out tritium partitioning and isotope effect experiments to see if this mechanism is accurate.[3] The kinetic studies support direct transfer, and the audience was shown details of the findings. Dr. Marsh then walked through the proposed mechanism of this rearrangement (see publications for full figures):

1. Initiation by glutamate (or methylaspartate) binding to the enzyme.
2. Homolysis of the Co-C bond, forming the radical. This is a very short-lived species.
3. Reaction occurs and a hydrogen atom is abstracted. Dr. Marsh explained this step may involve a high degree of hydrogen tunneling, and showed the audience some EPR results involving changes when 2-methyleneglutarate is used as substrate[4]. What occurs when a different substrate is used is a stable 3º radical is formed.
4. Fragmentation and recombination occurs during the interconversion of glutamyl and methylaspartyl radicals. This is an unusual step as it involves the 1,2-migration of an sp^3-hybridized carbon (unfavorable).
5. The final step is the reverse of the initial steps (# 1 & # 2).

This reaction has a total of 16 rate constants, and Dr. Marsh's group used the following methods to study the pre-steady-state, and steady-state kinetics. He went into detail about each method.

1. Stopped Flow Spectroscopy
2. Kinetic Isotope Effects
3. Rapid Chemical Quench
4. Mutagenesis – this is where the active site glutamate (acid) was mutated to a glutamine (amide), reducing the k_{cat} by 50-fold and is independent of pH.[5]

An interesting note regarding effects of Glu171Gln is the isotope effect is masked. Dr. Marsh went into detail regarding this finding, concluding the rate limited step is affected.

Dr. Marsh concluded his talk by emphasizing the exquisite control enzymes have over the critical biochemical reactions in biosystems. He acknowledged his colleagues, and entertained numerous questions.

Paul presented Dr. Marsh with a gift of the section's appreciation, and reminded everyone the next meeting will be at Lehigh on Thursday, 16-October-03. The meeting was adjourned at approximately 9:05 PM.

[1]Secretary's Note: Detailed information for Vitamin B_{12} (including NMR crystallography structures) can be found at NCBIs website, http://www.ncbi.nlm.nih.gov/. This includes dbSNP (including BLAST), LocusLink, OMIM, and PubMed search databases.

[2]Madhavapeddi, P., and Marsh, E.N.G. (2001) *Chemistry & Biology*. *8*, 1143-1149.
[3]Chih, H. and Marsh, E.N.G. (2001) *Biochemistry 40*, 13060-13067.
[4]Huhta, M.S., Daniele, C., Golding, B.T., and Marsh, E.N.G. (2002) *Biochemistry 41*, 3200-3206.
[5]Madhavapeddi, P., Ballou, D. P., and Marsh, E.N.G. (2002) *Biochemistry 41*, 15803-15809.

Respectfully Submitted,
Tara S. Baney
Secretary, LVACS
28-September-2003

LVACS Scholarship Winners -
Ryan Evans and Caitlan Sullivan

(reprinted with permission from www.lafayette.edu)

Ryan Evans

Marquis Scholar Ryan Evans '05 (Mohrsville, Pa.) recently received the Organic Chemistry Scholarship from the Lehigh Valley Section of the American Chemical Society. A biochemistry major, Evans scored the highest on an organic chemistry test administered by the Lehigh Valley American Chemical Society. Applicants also wrote a short paper on a topic in the field.

"Ryan is undoubtedly one of the best students we have ever had in organic chemistry at Lafayette over the past 16 years," says Charles Nutaitis, associate professor of chemistry. "Organic chemistry has the reputation of being one of the hardest courses at Lafayette or any college. Yet Ryan breezed through the course."

Among approximately 1,200 students who have taken organic chemistry since Nutaitis has taught the class, only a handful have earned marks as high as Evans', the professor notes. The award follows a summer-long collaborative research project in which Evans fed, infected, observed, and dissected tiny, disk-shaped snails. Evans conducted the work, which is likely to yield big results for a career in research, as an EXCEL Scholar with Bernard Fried, professor emeritus of biology, and Joseph Sherma, professor emeritus of chemistry.

Lafayette is a national leader in undergraduate research. In Lafayette's distinctive EXCEL Scholars program, students assist faculty with research while earning a stipend. Many of the 180 students who participate each year go on to publish papers in scholarly journals and/or present their research at conferences.

Evans fed lettuce to one group of Helisoma trivolvis snails and egg yolks to a second group, watched as the first group turned greenish brown and the second group turned orange-yellow, then dissected the snails, extracted pigments, and analyzed the pigments using thin-layer chromatography (TLC). He also dissected a group of Biomphalaria glabrata snails infected with Schistosoma mansoni parasites and conducted similar TLC analyses.

"We were hoping to more closely see what diet and parasitism do to these snails, since they are an important model in the life cycles of countless parasites that also infect humans," says Evans, who is co-writing a paper on the subject with Fried and Sherma that will be submitted to an academic journal. The diets, as Fried says they expected, had a "dramatic effect" on pigmentation. Fried also says that Evans used sophisticated techniques to analyze the data he gathered on the parasite-infected snails. "No one in the past has used these more sensitive quantitative techniques."

Fried also notes that Evans worked independently for much of the project. "He's very steady," he says. "He's done a very good job."

For Evans, who hopes to continue his biochemistry studies in graduate school, the opportunity to publish a paper equals increased choices among graduate programs.

"I like using chemistry techniques on biological applications, since this is probably what I will be doing in the future," he adds. "I also enjoy the freedom I am given to explore these situations and the excitement of finding new knowledge when the results come in."

Evans points out that both Fried and Sherma offered him help when he needed it.

"They directed me in the right way, but gave me ample freedom to explore, perform experiments, and come to conclusions on my own," he says.

Included in the current edition of Who's Who in America and once featured on the Discovery Channel, Fried is one of the world's foremost experts in the field of parasitology, with three organisms named in his honor. His research has led to important advances in the effort to conquer tropical diseases caused by parasitic flatworms.

Author of more than 550 research papers, books, and reviews, Sherma has spent much of his career advancing the fields of pesticide analysis and chromatography, a procedure for separating closely related compounds for analysis. A recipient of the Award for Research at an Undergraduate Institution by American Chemical Society, Sherma has involved more than 140 different students as coauthors for over 195 papers published in peer-reviewed journals.

In January 2002, Evans took one of Lafayette's distinctive three-week interim-session courses in London. He is a member of the campus chapter of the American Chemical Society and the Physics Club, serves as a campus tour guide, and plays club volleyball.

Caitlin Sullivan

For much of her life, Caitlin Sullivan '05 (Bethlehem, Pa.) has loved to observe events and figure out why they happen. So when she got the opportunity this summer to conduct faculty-guided research at a local chemical manufacturing firm, she accepted it gladly.

"I got the best of both worlds," Sullivan says, explaining that Joseph Sherma, professor emeritus of chemistry, guided her EXCEL-funded research from campus, and Paul Bouis, research director of laboratory products at Mallinckrodt Baker Inc. in nearby Lopatcong Township, N.J., directed her on-site work.

Lafayette is a national leader in undergraduate research. In Lafayette's distinctive EXCEL Scholars Program, students collaborate with faculty on research while earning a stipend. Many of the more than 180 students who participate each year go on to publish papers in scholarly journals and/or present their research at conferences.

Sullivan's research, which she is continuing part-time during the fall semester, centers on finding ways to show scientists the benefits of Mallinckrodt Baker's thin-layer and flash chromatography products. Chemists and biologists use chromatography procedures to separate closely related compounds for analysis. Thin-layer chromatography (TLC) is conducted on disposable plates, while flash chromatography is conducted in cylindrical columns, ranging from several inches to several feet high. Chemists who are synthesizing new compounds use TLC plates to screen the correct solvent mixture to use in flash chromatography.

"Caitlin was actually working on a prototype of an instrument to modernize flash chromatography," Bouis says, explaining that the instrument has a built-in detector that indicates when a compound is emerging, and a low-pressure pump that pushes solvents through the column.

Sullivan, a chemistry major and math minor, conducted experiments proving that spherical silica is the most efficient sorbent material for scientists to use when combining thin-layer and flash chromatography techniques.

"Experimentally, I found the appropriate composition so that Baker can now produce its own TLC plates instead of repackaging other companies' plates," Sullivan says. "I felt a real purpose in the research that I did, and it was a very rewarding experience."

Bouis says that while many Lafayette interns have gained experience at Mallinckrodt Baker, Sullivan was the first EXCEL Scholar to conduct research there.

"We're hoping to do more and to work with other professors," he says, pointing out that Sullivan excelled, considering she had completed only two years of college work. "She had a very good work ethic here and she went beyond what the project called for," Bouis says. "She was very good at anticipating what needed to be done to solve a problem — and she's very mechanically inclined."

Sherma says both he and Bouis met Sullivan during her senior year at Bethlehem Catholic High School, when she won a $1,000 scholarship sponsored by the Lehigh Valley Section of the American Chemical Society. At the time, Bouis served as the section's chair, and Sherma was chair-elect.

Sullivan, who hopes to earn a Ph.D. in chemistry, also conducted EXCEL research with Sherma during the January interim session between semesters, and coauthored a paper titled "Development and Validation of an HPTLC Method for Assay of Caffeine and Acetaminophen in Multicomponent Extra Strength Analgesic Tablets," which has been accepted for publication in the Journal of Liquid Chromatography & Related Technologies.

"Lafayette's facilities are amazing and the small-school environment is very advantageous to doing research," Sullivan says. "Working not only at Lafayette, but also in industry, is making me a more favorable candidate for graduate schools."

Sullivan adds that Sherma has been particularly helpful to her in her two years at Lafayette.

"Dr. Sherma has been an amazing research adviser," she says. "He is continually there to guide me through my research projects, and gives me enough independence to really learn the most from my research experience. He makes me strive for my goals, so that one day, I may possibly know as much about chemistry as he does."

Sullivan serves as a teaching assistant for general chemistry laboratory sessions and as a tutor with Lafayette's Academic Resource Center. She's also president of the campus tennis club, works as a lifeguard at the campus swimming pool, and is a member of Sigma Xi, the international honor society for engineering and science research. She's a graduate of Bethlehem Catholic High School.

Nominations Needed!

Elections for LVACS officers are coming soon and we need nominations for all positions.

See minutes, this issue, for current slate.
For nominations please contact:
Carol Libby - Nominations Chair
(clibby@cs.moravian.edu)
It's a great way to contribute!

This Month in Chemical History

Harold Goldwhite, California State University, Los Angeles
hgoldwh@calstatela.edu

In 1962 the late Thomas Kuhn, a distinguished historian of science who started out as a physical chemist, published his most influential book "The Structure of Scientific Revolutions". It was in this work that Kuhn discussed paradigms, "universally recognized scientific achievements that for a time provide model problems and model solutions to a community of practitioners." Science textbooks, according to Kuhn, are firmly based upon such paradigms and consequently the study of science textbooks can give historians insight into the actual state of a science at the time of publication of the text. My own library contains many texts in the physical and biological sciences dating back to

the late eighteenth century, a few in original editions and more in facsimile.

Early this month I was browsing at a very miscellaneous stall at a local flea market and after some intense haggling bought a couple of early twentieth century science texts at a dollar apiece. In mynext few columns I plan to examine the state of chemistry and, subsequently, physics a century ago as established by looking at these texts.

The chemistry book, published by Macmillan in New York in 1905, is "Outlines of Inorganic Chemistry" authored by Frank Austin Gooch, Professor of Chemistry in Yale University, and Claude Frederick Walker, teacher of chemistry in the High School of Commerce of New York City. The text is intended for use in both schools and colleges and is arranged in an interesting way. Part I, consisting of 233 pages, is labeled "Inductive" and "takes up the consecutive experimental development of the principles upon which systematic chemistry rests." "Only in the final chapter of this part is the notion of the atom introduced" - but more of that later. Part II, labeled "Descriptive" ,contains 493 pages and discusses "the properties of the elements and their compounds... in accordance with a modification of Mendeleeff"s Periodic System...Graphic symbols, explained as simply diagrammatic, are used freely ...We have not thought it desirable, however, to make use of the extreme developments of the idea of free ions."

The nineteenth and even the early twentieth centuries saw many discussions in the scientific community about the validity or reality of atomic concepts. The interested reader may consult "Chemical Atomism in the Nineteenth Century" by Alan J. Rocke (Ohio State University Press, 1984) for a comprehensive account of this period. As late as 1904, a year before the publication of the text under examination, the great German physical chemist Wilhelm Ostwald, in his Faraday Lecture to the Chemical Society of London, said "Chemical dynamics has...made the atomic hypothesis unnecessary ... I am quite aware that in making this assertion I am stepping on somewhat volcanic ground." With such authority on that side of the question it may not be surprising that Gooch and Walker in their chapter on theory state: "in the chemical sense the atom is, therefore, something that has not been divided - the smallest mass of a chemical element which enters into any known chemical compound. With ideas of indivisibility, indestructibility, absolute hardness, or with any of the abstract conceptions which for the philosopher cluster about the word atom, the chemist has nothing to do." They do go on to mention the experiments of J.J.Thomson which lead to "the idea that the atoms of the elements are built up of simpler systems of primordial atoms and electrons, or corpuscles of negative electricity..."

Given the state of chemical theory in 1905 it is not surprising that Gooch and Walker equivocate on the nature of ions in solution, offering the reader three distinct hypotheses. That of Arrhenius suggests that "the ions of electrolytes exist in free condition in solutions sufficiently dilute". J.J.Thomson, Nernst, and Fitzgerald have independently explained ionization by proposing that "the electrolyte enters into chemical reaction with the solvent, and that the assumed freedom of the ion is in reality an ever changing bondage to the solvent" (a view that sounds quite modern to me). And Reychler maintains that the phenomena of solution are better explained by polarization of an un-ionized electrolyte molecule by specific solvent action.

Chemistry Question of the Month

What globe trotting Physicist won the Nobel Prize in Chemistry even though his Ph.D. was in Physics? Hint: his career began in the Netherlands, continued to Munich, Zurich and finally the U.S. at Cornell.

Come to the October Meeting for the Answer!

Nobel Biography

Reprinted from Nobel Lectures, Chemistry 1963-1970, Elsevier Publishing Company, Amsterdam

Dorothy Crowfoot was born in Cairo on May 12th, 1910 where her father, John Winter Crowfoot, was working in the Egyptian Education Service. He moved soon afterwards to the Sudan, where he later became both Director of Education and of Antiquities; Dorothy visited the Sudan as a girl in 1923, and acquired a strong affection for the country. After his retirement from the Sudan in 1926, her father gave most of his time to archaeology, working for some years as Director of the British School of Archaeology in Jerusalem and carrying out excavations on Mount Ophel, at Jerash, Bosra and Samaria.

Her mother, Grace Mary Crowfoot (born Hood) was actively involved in all her father's work, and became an authority in her own right on early weaving techniques. She was also a very good botanist and drew in her spare time the illustrations to the official Flora of the Sudan. Dorothy Crowfoot spent one season between school and university

with her parents, excavating at Jerash and drawing mosaic pavements, and she enjoyed the experience so much, that she seriously considered giving up chemistry for archaeology.

She became interested in chemistry and in crystals at about the age of 10, and this interest was encouraged by Dr. A.F. Joseph, a friend of her parents in the Sudan, who gave her chemicals and helped her during her stay there to analyse ilmenite. Most of her childhood she spent with her sisters at Geldeston in Norfolk, from where she went by day to the Sir John Leman School, Beccles, from 1921-28. One other girl, Norah Pusey, and Dorothy Crowfoot were allowed to join the boys doing chemistry at school, with Miss Deeley as their teacher; by the end of her school career, she had decided to study chemistry and possibly biochemistry at university.

She went to Oxford and Somerville College from 1928-32 and became devoted to Margery Fry, then Principal of the College. For a brief time during her first year, she combined archaeology and chemistry, analysing glass tesserae from Jerash with E.G.J. Hartley. She attended the special course in crystallography and decided, following strong advice from F.M. Brewer, who was then her tutor, to do research in X-ray crystallography. This she began for part II Chemistry, working with H.M. Powell, as his first research student on thallium dialkyl halides, after a brief summer visit to Professor Victor Goldschmidt's laboratory in Heidelberg.

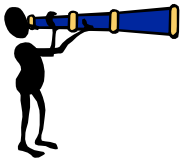
Her going to Cambridge from Oxford to work with J.D. Bernal followed from a chance meeting in a train between Dr. A.F. Joseph and Professor Lowry. Dorothy Crowfoot was very pleased with the idea; she had heard Bernal lecture on metals in Oxford and became, as a result, for a time, unexpectedly interested in metals; the fact that in 1932 he was turning towards sterols, settled her course.

She spent two happy years in Cambridge, making many friends and exploring with Bernal a variety of problems. She was financed by her aunt, Dorothy Hood, who had paid all her college bills, and by a £75 scholarship from Somerville. In 1933, Somerville, gave her a research fellowship, to be held for one year at Cambridge and the second at Oxford. She returned to Somerville and Oxford in 1934 and she has remained there, except for brief intervals, ever since. Most of her working life, she spent as Official Fellow and Tutor in Natural Science at Somerville, responsible mainly for teaching chemistry for the women's colleges. She became a University lecturer and demonstrator in 1946, University Reader in X-ray Crystallography in 1956 and Wolfson Research Professor of the Royal Society in 1960. She worked at first in the Department of Mineralogy and Crystallography where H.L. Bowman was professor. In 1944 the department was divided and Dr. Crowfoot continued in the subdepartment of Chemical Crystallography, with H.M. Powell as Reader under Professor C.N. Hinshelwood.

When she returned to Oxford in 1934, she started to collect money for X-ray apparatus with the help of Sir Robert Robinson. Later she received much research assistance from the Rockefeller and Nuffield Foundations. She continued the research that was begun at Cambridge with Bernal on the sterols and on other biologically interesting molecules, including insulin, at first with one or two research students only. They were housed until 1958 in scattered rooms in the University museum. Their researches on penicillin began in 1942 during the war, and on vitamin B12 in 1948. Her research group grew slowly and has always been a somewhat casual organisation of students and visitors from various universities, working principally on the X-ray analysis of natural products.

Dorothy Hodgkin took part in the meetings in 1946 which led to the foundation of the International Union of Crystallography and she has visited for scientific purposes many countries, including China, the USA and the USSR. She was elected a Fellow of the Royal Society in 1947, a foreign member of the Royal Netherlands Academy of Sciences in 1956, and of the American Academy of Arts and Sciences (Boston) in 1958.

In 1937 she married Thomas Hodgkin, son of one historian and grandson of two others, whose main field of interest has been the history and politics of Africa and the Arab world, and who is at present Director of the Institute of African Studies at the University of Ghana, where part of her own working life is also spent. They have three children and three grandchildren. Their elder son is a mathematician, now teaching for a year at the University of Algiers, before taking up a permanent post at the new University of Warwick. Their daughter (like many of her ancestors) is an historian-teaching at girls' secondary school in Zambia. Their younger son has spent a pre-University year in India before going to Newcastle to study Botany, and eventually Agriculture. So at the present moment they are a somewhat dispersed family. Dorothy Crowfoot Hodgkin died in 1994.



Look For LVACS on the web at www.esu.edu/lvacs

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News From National ACS

Funding for Divisions and Local Sections

The amendments to the Constitution to increase funding for divisions and local sections, approved by the Council in New Orleans last spring, were subsequently ratified by the membership:

FOR	20,430
AGAINST	3,197

LSAC Launches Local Section Innovative Projects Grant Program

In an effort to enhance the effectiveness and vitality of local sections, the ACS Local Section Activities Committee (LSAC) is pleased to announce a new small grants program for local sections. Beginning in 2004, a pool of approximately $110,000 will be available annually to local sections through the "Local Section Innovative Projects Grant Program". Innovative projects include, but are not limited to, ones that promote local section and division interaction, promote interactions between two or more sections, or that can improve programming for a local section with special financial needs.

All local sections are encouraged to submit proposals by the October 1, 2003 deadline, for projects that will be launched in 2004. Sections can request up to $3000 and may only submit one proposal per year. Funds may not be used for hardware purchases, honoraria, stipends, alcoholic beverages or meals (other than light snacks). For more details on proposal guidelines, go to www.chemistry.org/localsections or contact the ACS Department of Local Section & Community Activities at 1-800-227-5558 ext. 6360.

Editors Note: If you have any ideas for a local section grant please contact a section officer.

The Women Chemists Committee
of the American Chemical Society
is pleased to
Call for Applications for Travel Awards

For post-doctoral, graduate, and undergraduate women to make their first research presentation at a scientific meeting.
Sponsored by:
Eli Lilly & Company
For more information and an application form, contact
Cheryl Brown, 800/227-5558 ext. 6123
http://membership.acs.org/W/WCC
or e-mail: wcc@acs.org
American Chemical Society
1155 Sixteenth St. NW; Washington, DC 20036
Deadline for receipt of applications for 2004 meetings:
Feb. 15, 2004 – Meetings from July 1 and Dec. 31, 2004

Project SEED 35th Anniversary

Since 1968, Project SEED has opened the door to science experiences for economically disadvantaged high school students who otherwise might not have this opportunity. More than 7,100 talented students have experienced scientific research during the summer months in local academic, industrial, and governmental laboratories with volunteer research chemists as mentors.

Your support for the summer program, college scholarships, and/or the endowment will enable ACS to keep the doors to a career in chemistry open to students in need.