

# THE Central Arkansas



CHEMIST

The Newsletter of the Central Arkansas Local Section of the American Chemical Society

September, 2003

## General Meeting

Monday, September 15

Location: Jo Ellen Ford Auditorium  
Reynolds Center on Aging  
UAMS  
Little Rock, AR

5:30 p.m. Dinner with Speaker  
Macaroni Grill  
Shackleford & Markham, LR

7:30 p.m. Program  
Dr. Dean F. Martin  
"Why Don't We Live Longer?"

*To obtain driving directions, visit  
[membership.acs.org/c/centralarkansas](http://membership.acs.org/c/centralarkansas)*

For our September meeting, we welcome Dr. Dean Martin of the University of South Florida.

## WHY DON'T WE LIVE LONGER?

The observed life span in the United States (74 +/- 5) years corresponds remarkably closely to the mention in the Book of Psalms of the Old Testament (three score and ten) and is significantly different from the estimated potential of about 120 years. This presentation examines the role of land factors in heart death rates and cancer death rates; both death rates are highly variable throughout the United States, and the concept that inter-regional

migration of persons and transshipment of food would preclude geographical variations in heart death rates or cancer death rates seems outworn. Longevity would be increased through favorable lifestyle as well as by following nutrition standards set by the U.S. National Academy of Sciences, including properly balanced available supplements. Attention will be focused on one example, human health effects of wide-spread deficiencies in soil selenium.

## Speaker's Biographical Sketch

Dean F. Martin is Distinguished Service Professor and Director of the Institute for Environmental Studies at the University of South Florida, where he has been a member of the faculty since 1964. Previously, he was a member of the faculty of the University of Illinois as instructor and assistant professor of inorganic chemistry (1959-1964).

He and his wife, Barbara B. Martin, share research interests concerned with the coordination chemistry of natural water systems, including problems of red tide and aquatic weeds. The Martins have been editors of the Florida Scientist (1984- ), and Dean is a senior editor of the Florida Journal of Public Health (1990- ). Dean Martin is the author or co-author of about 300 publications, including four books.

He received his B.A. degree from Grinnell College in 1955 and his Ph.D. from the Pennsylvania State University in 1958. In 1958-1959, he was a National Science Foundation Post-Doctoral Fellow at University College, London. He received (1969-1974) a Career Development Award from the Division of General Medical Sciences, National Institutes of Health, to study the chemistry and

chemical environment of algal toxins. In 1970-1971, he was a visiting professor of Physiology and Pharmacology at Duke University Medical Center.



He was the recipient of the 1975 Florida Award and the 1987 Civic Service Award of the Florida Section; in 1978, he received the F. J. Zimmerman Award in Environmental Science from the Central Wisconsin Section, sponsored by Zimpro Inc; and in 1983, he was elected Fellow of the American Association for the Advancement of Science.

Dean and Barbara Martin were the co-recipients of the 1994 Medalist Award of the Florida Academy of Sciences, its highest award. Dean Martin has been active in the Florida Sections of the American Chemical Society (chair, 1986), and he has held several positions in the Aquatic Plant Management Society (president, 1986-1987).

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## Looking Ahead

October 23 Dr. Derek Sears, "Water on Mars", UALR Planetarium

Ever at a loss as to what's going on in the section? Simply visit the section's website:

<http://membership.acs.org/c/centralarkansas>

You'll find the section's meeting schedule, announcements, and information about services provided by the section, along with other useful links.

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## Local Section News

National Chemistry Week is just around the corner. The dates are Oct. 19-25 with the topic, "Earth's Atmosphere and Beyond!" Contact our section's NCW coordinator, Howard Hendrickson, with your ideas and if you need support from the local section. Howard's email is [hendricksonhowardp@uams.edu](mailto:hendricksonhowardp@uams.edu).

Nominations for section officers are currently being taken. A ballot will be included in next month's newsletter. If you are interested in getting more involved with the section, now's your chance. Or if you know someone who should be, do them a favor and nominate them. Contact any current officer with your nominations before October 10.

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## National News

### CEPA TO PRESENT THREE SYMPOSIA AT NEW YORK MEETING

A Presidential Event on "Opportunities in the Bio and Pharma Areas" is among three career-related symposia to be presented by the Committee on Economic and Professional Affairs at the upcoming New York national meeting.

Biotechnology and pharmaceutical research are hot areas today in terms of drug discovery, fundamental research, and new business opportunities. These areas are projected to produce a large segment of the employment for chemists and chemical engineers in the future.

After introductory remarks by ACS President-elect Charles Casey, a group of well-known experts will provide an overview of the many opportunities in these areas. Among the topics of discussion will be new technology, innovation and opportunities for growth. The symposium, to be held 8:30-12:00 PM on Monday September 8, is co-sponsored by BIOL, PROF, WCC, and YCC.

A second symposium, "Face-to-Face with Intellectual Property Protection and Commercialization Issues," will explore a variety of

vital issues surrounding intellectual property protection and transfer. Speakers will discuss topics ranging from patents to venture capital to establishing new businesses. The symposium will be held on Monday, 1:00-4:00 PM September 8. The primary sponsor is the Division of Chemistry and the Law. The co-sponsors are the Department of Career Services, Office of Graduate Education, the Division of Small Chemical Businesses, CEPA Committee on Professional Training, and the Committee on Education.

“The Need for ENDA, the Employment Non-Discrimination Act, in the Chemical Process Industries,” to be held 1:30-4:10 PM on Tuesday September 9, fills out CEPA’s symposia lineup. This presentation will cover the current state of the workplace for lesbian, gay, bisexual, and transgender workers. The legal environment at the federal, state, and local levels under which they operate will be discussed, as well as efforts to change those laws. The event is sponsored by the Division of Professional Relations and co-sponsored by CEPA, YCC, WCC, and CHAL.

For more information about the symposia, call DCS at 1 (800) 227-5558 x6208

## **SAFETY PUBLICATIONS FROM ACS**

The ACS Joint Board-Council Committee on Chemical Safety (CCS) is pleased to announce the availability of the seventh edition of Safety in Academic Chemistry Laboratories (SACL). SACL is the flagship publication of CCS and has been in print continuously since 1972. This edition has two volumes: volume 1 for college and university students; and volume 2 for faculty, graduate teaching assistants, and administrators. With this latest edition of SACL, CCS has now produced new safety booklets within the last two years for all academic levels: Safety in the Elementary (K-6) Science Classroom; Chemical Safety for Teachers and Their Supervisors, Grades 7-12; and SACL. All of these publications may be ordered from ACS (single copies are free) and may be viewed in PDF on the Committee website, <http://chemistry.org/committees/ccs>.

## **THIS MONTH IN CHEMICAL HISTORY**

Prepared for SCALACS, the journal of the Southern California, Orange County, and San Geronimo Sections of the ACS, Harold Goldwhite, California State University, Los Angeles

In looking over my card catalog where significant events in the chemical heritage are listed by the months in which they have occurred (yes, I still have an old-fashioned card catalog; just been too lazy/busy to transform it into a digitized electronic data base) I find that the stack of events for September is one of the thickest. Among birthdays there are Nobel laureates Aston, Ostwald, Soddy, Delbruck, Moore, Cornforth, Barton, Compton, Irene Joliot-Curie, Willstaetter, Robinson, Ruzicka, Szent-Gyorgyi, Courmand, Ochoa, Florey, Morgan, Moissan, and Fermi. I have written SCALACS columns about a number of these and about other non-Nobelists born in September such as Carl Auer, Baron von Welsbach; Dalton; Kekule; Castner; Rouelle; Dewar; and Faraday. This month I will give a short summary of the career of the distinguished German organic chemist, Adolph William Hermann Kolbe, generally known as Hermann Kolbe, who was born near Goettingen on September 27, 1818.

Kolbe was the first of fifteen children of a Lutheran minister. He started his studies with Woehler in 1838, just six years after Liebig and Woehler's seminal paper on the benzoin radical had appeared; this was one of the first demonstrations that particular groupings of atoms -- the radicals -- could maintain their integrity in the course of a set of organic reactions. Liebig and Woehler speculated that radicals were to organic chemistry as elements were to inorganic. Kolbe moved to Marburg as Bunsen's assistant in 1842, and then to London in 1845 where he worked with Lyon Playfair in the Museum of Economic Geology analysing gases that might be involved in mine explosions. Another of Playfair's assistants was Edward Frankland, father of organometallic chemistry and of the concept of valency; Kolbe and Frankland became lifelong friends. In 1845 Kolbe, accompanied by Frankland, returned to Marburg where Frankland initiated his work on organozinc compounds, which he continued on his return to England. Kolbe succeeded Bunsen in the Chair at Marburg in 1851. After 14 years there he was called to Leipzig after Liebig's death; the university built a large new

laboratory for him and his students. Kolbe excelled as a teacher and author. In addition to his own textbooks he contributed to Liebig and Woehler's comprehensive (10 volume) textbook of pure and applied chemistry. From 1870 he was editor of the influential Journal fuer Praktische Chemie.

Kolbe had strong views on the place of theory in chemistry. Following Berzelius he viewed organic compounds as derived from carbon dioxide by substitution, coupling, and other processes. Connections between compounds were purely formal and he regarded all efforts to describe the relative positions of atoms either in terms of connectivity or, worse, in terms of spatial relationships as hopeless and fundamentally unsound. This inevitably put Kolbe on a collision course with developing new chemical theories. I will return to this topic later, but first some comments on Kolbe's triumphs. In the course of work on chlorinated ethanes Kolbe effected the first complete synthesis of an organic compound, acetic acid, from inorganic precursors. His carbon source was carbon disulfide, chlorination of which gave carbon tetrachloride. This was pyrolyzed to yield tetrachloroethylene, aqueous chlorination of which gave trichloroacetic acid. This was reduced to acetic acid in an electrolytic cell. Kolbe went on to use electrolysis to produce what he originally regarded as hydrocarbon radicals (we now recognize them as dimers) from carboxylic acids -- one of the Kolbe reactions. In collaboration with Frankland he worked out the general homologation reaction in which an alkyl halide is converted to a nitrile and thence to a carboxylic acid. Another Kolbe reaction is the production of salicylic acid from phenol and carbon dioxide. Kolbe showed that the product was a useful disinfectant.

To return to Kolbe as author and critic, and here I quote from Vol. IV of Partington's magisterial History of Chemistry: "He was straightforward and fearless and quite unawed by authority .... his criticisms of the work and ideas of his contemporaries (particularly Kekule, Baeyer, and Emil Fischer) were more forcibly expressed than is now customary." I will close with the most famous example of Kolbe's rhetoric. When van't Hoff published his "Chemistry in Space" as a short book

in 1876 it included a preface by Wislicenus. Kolbe rushed into print: "I would have ignored this work ... had not a significant chemist [Wislicenus] ... recommended it ... A Dr. J. H. van't Hoff, employed at the School of Veterinary Medicine at Utrecht finds ... exact chemical research not to his taste. He has thought it more convenient to mount Pegasus (borrowed, no doubt, from the Veterinary School) and to proclaim ... how on his daring flight to the chemical Parnassus the atoms appeared to be arranged in space ... To criticize this paper in any detail is impossible because the play of imagination completely forsakes the solid ground of fact and is quite incomprehensible to the sober chemist."

Hermann Kolbe, a sober chemist and a great experimentalist, died near Leipzig on November 25, 1884.

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## Perspective

*Even if you are on the right track, you'll get run over if you just sit there.*

--Will Rogers, humorist

*Courage is being scared to death...and saddling up anyway.*

--John Wayne

*It wasn't raining when Noah built the ark.*

--Howard Ruff

*You have to think anyway, so why not think big?*

--Donald Trump

*Miracles sometimes occur, but you have to work terribly hard for them.*

--Chaim Weizmann

*You're never beaten unless you give up. You may have a fresh start at any moment you choose.*

--Mary Pickford

# From the ACS Recipe Book

## Chocolate Chip Cookies

### Ingredients:

1. 532.35 cm<sup>3</sup> gluten
2. 4.9 cm<sup>3</sup> NaHCO<sub>3</sub>
3. 4.9 cm<sup>3</sup> refined halite
4. 236.6 cm<sup>3</sup> partially hydrogenated tallow triglyceride
5. 177.45 cm<sup>3</sup> crystalline C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>
6. 177.45 cm<sup>3</sup> unrefined C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>
7. 4.9 cm<sup>3</sup> methyl ether of protocatechuic aldehyde
8. Two calcium carbonate-encapsulated avain albumen-coated protien
9. 473.2 cm<sup>3</sup> theobroma cacao
10. 236.6 cm<sup>3</sup> de-encapsulated legume meats (sieve size #10)

To a 2-L jacketed round reactor vessel (reactor #1) with an overall heat-transfer coefficient of about 100 Btu/F-ft<sup>2</sup>-hr add one, two, and three with constant agitation.

In a second 2-L reactor vessel with a radial flow impeller operating at 100 rpm add four, five, six, and seven until the mixture is homogeneous.

To reactor #2 add eight followed by three equal portions of the homogeneous mixture in reactor #1. Additionally, add nine and ten slowly with constant agitation. Care must be taken at this point in the reaction to control any temperature rise that may be the result of an exothermic reaction.

Using a screw extrude attached to a #4 nodulizer place the mixture piece-meal on a 316SS sheet (300 x 600 mm). Heat in a 460K oven for a period of time that is in agreement with Frank & Johnston's first order rate expression (see JACOS, 21, 55), or until golden brown.

Once the reaction is complete, place the sheet on a 25 deg. C heat-transfer table allowing the product to come to equilibrium.

If you have an article or job posting that you would like to have considered for publication in our newsletter, send it to [perrym@obu.edu](mailto:perrym@obu.edu) for review.