



Newsletter for Senior Chemists

June 2016

Dear ACS Member:

Welcome to the latest edition of our *Newsletter for Senior Chemists*.

As the new Chair of the ACS Senior Chemists Committee (SCC), I want

everyone to know of my strong support for this newsletter. It is a great vehicle for connecting and communicating with a large group of interested and interesting ACS senior chemists.



Our editor, Lynn Hartshorn, and I have been working on incorporating some new ideas for sustainable columns. We are starting a series of articles about lesser known museums, interesting places and historical locations that SCC members have uncovered and enjoyed while traveling. If you find these articles interesting, you may wish to visit some of these sites as you travel. We are also working on a future special series with the ACS International Activities Committee to share information and highlights on what our ACS international chapters are doing.

We thank you for your comments, feedback, and suggestions. It is our ongoing effort to provide a biannual contact through this newsletter to engage all of our senior ACS members. Let me assure you, each and every piece of feedback is read, considered, and responded to, so keep them coming. Thanks for your support!

Dr Thomas Beattie gained his Ph.D. in Physical

Senior Chemists Committee:

Dr. Thomas R. Beattie, Chair
Beattietr@aol.com

Dr. Raymond P. Anderson
rpanderso@aol.com

Dr. Ronald D. Archer
archer@chem.umass.edu

Dr. Roger F. Bartholomew
rbarthol@stny.rr.com

Dr. Dennis Chamot
dennischamot@yahoo.com

Dr. James L. Chao
chao_j@bellsouth.net

Ms. Michaeline F. Chen
mfuchen@verizon.net

Dr. Donald D. Clarke
clarke@fordham.edu

Dr. Catherine E. Costello
cecmsms@bu.edu

Dr. Allen A. Denio
alvaldenio@verizon.net

Ms. Susan R. Fahrenholtz
fahrenholtz@fordham.edu

Dr. Herbert S. Golinkin
hgolinkin@sbcglobal.net

Organic Chemistry at The University of Wisconsin. His career has been mainly spent working in early stage drug discovery, and he currently consults in the biopharmacy area. He has served on the Senior Chemists Committee (SCC) for several years, and is now the SCC chair. His work on the SCC has included planning the very successful series of Senior Chemists Breakfasts held at National Meetings, and finding speakers for that event. He lives in San Diego and is a member of the San Diego Local Section.

Goodbye George and Cheryl!



A celebration in honor of George Heinze was held at the end of the Senior Chemists Committee (SCC) meeting at the ACS meeting in Boston. Michele Buchanan from Oak

Ridge National Laboratories, an ACS Councilor and the ConC liaison to SCC, presented George with a plaque. The SCC members expressed their deep appreciation for his leadership during the formative years of the SCC. George served as the chair since the SCC officially became a committee in January 2013, and was also a member of the prior working group, the Senior Chemists Task Force.



We also said goodbye to our long-term staff liaison, Cheryl Brown, at the ACS meeting in San Diego. We were sad to see Cheryl retire. She has been with the SCC since the Task Force began, and has worked hard for our group over the years. She will be missed. We wish her a happy retirement!

Dr. Lynn G. Hartshorn
lghartshorn@stthomas.edu

Dr. Thomas R. Hays
thomas.hays@retiree.tamuk.edu

Dr. Richard A. Hermens
richard.hermens@me.com

Dr. Robert S. Moore
rmoore362@rochester.rr.com

Dr. Edel Wasserman
ez@wasserman1.com

Committee Associates:
Dr. Warren T. Ford
warren.ford@okstate.edu

Dr. Donald K. Harriss
dharriss@d.umn.edu

Mr. Norman W. Henry, III
shbp65@comcast.net

Dr. E. Gerald Meyer
egmeyer@uwyo.edu

Dr. Roger A. Parker
parker.r@fuse.net

Dr. J. Ernest Simpson
jesimpson@cpp.edu

Consultant:
Mr. George E. Heinze,
donnergeist@verizon.net

ConC Liaison:
Dr. Michelle V. Buchanan
buchananmv@ornl.gov

Staff Liaison:
Ms. Semora J. Smith
s_smith@acs.org

Contact Us
silvercircle@acs.org

The Newsletter for Senior Chemists is published by the American Chemical Society's Division of Membership & Scientific Advancement.

Also during the San Diego meeting, we welcomed Semora Smith, who is the new staff liaison for SCC. She has provided support for the new Councilors' activities, the ACS Strategy Café, and the Planning Committee. We look forward to working with Semora!

The Senior Chemists Breakfast at the ACS Meeting in San Diego

By Tom Beattie (SCC Chairman) and Lynn Hartshorn (SCC Newsletter Editor)

The Senior Chemists Breakfast was held on Tuesday morning March 15 during the ACS national meeting in San Diego. The speaker was Dr. Margaret Leinen, Director of the Scripps Institution of Oceanography and Vice Chancellor of the University of California, San Diego. In an outstanding presentation entitled "Our Changing Oceans: The Challenges from Climate Change," she illustrated and discussed how improvements in instrumentation have created a revolution in the ability of oceanographers to collect and interpret massive amounts of data used to characterize our oceans; and the changes that this instrumentation has observed.



Ocean scientists use instruments called Argo floats, which are autonomous ocean-traveling robots programmed to sink more than a mile below the ocean surface and drift for as long as four years. Every 10 days the instruments surface to record the ocean's temperature, salinity and currents and to relay the information to satellites. Within hours, the information is transmitted to the Global Telecommunications System and is freely available on the Internet. The floats then sink again to begin a new cycle.

This network of about 3,000 floats, which reached full observational capacity in fall 2007, is creating an unprecedented profile of the world's oceans. Data from the Argo program, which its leaders hope will last several decades, could transform the way scientists understand the oceans and its effects on climate. Dr. Leinen discussed some of the observations of changes in the ocean that these instruments have measured

She pointed out that climate change is changing oceans rapidly. Changes that we should worry about are:

1. Acidification caused by increasing carbon dioxide in the atmosphere. This lowering of pH has effects on organisms and coral reefs.
2. Ocean Warming. "Argo" floats take continuous temperature measurements across the oceans, and have shown a warming trend since 40 years ago when temperature measurements started. One of the effects of this warming is a decrease in sea ice. Greenland has lost much of its ice cap, and previously frozen areas of the Arctic are now becoming open to shipping, which could harm the Arctic environment. The water from melting ice adds to sea level rise. Since 1800, a change of two feet has been observed, leading to a flood risk for areas such as South Florida and the Gulf, and storm surges that are routinely 15 feet higher than high tide. The rate of this sea level change is increasing.
3. The concentration of dissolved oxygen is decreasing in many regions, leading eventually

to effects such as a decrease in fish body size.

Dr. Leinen pointed out that all of us need to think about the impact that our use of earth's resources is having, and plan for the future. A lively questions and answer session followed. (Much more information about the work done at the Scripps Institute, and many photos can be found on the website: www.scripps.ucsd.edu)

Notice: The Philadelphia Senior Chemists Breakfast

We are currently planning for the next breakfast to be held at the 252nd ACS National Meeting in Philadelphia, PA on Tuesday, August 23, 2016. Watch in the coming months for details on the next speaker and be sure to purchase tickets when you register for that meeting.

An Essay on Aging by E.G. Meyer

E.G. "Gerry" Meyer was born on November 2, 1919 in Albuquerque, NM. His father was in the sheep and wool business so Gerry spent high school summers in various NM locations helping with shearing and "dipping" sheep. He went to Carnegie Tech (now Carnegie Mellon University) graduating in 1940. That was the year Gerry joined the ACS. He worked for a year and then started graduate school at Carnegie, but WWII interrupted his program. He joined the Navy and after being released in 1945, he returned to NM and ultimately to graduate school at the University of New Mexico where he received his Ph.D. in 1950. After three years in Albuquerque, he went to N.M. Highlands University where he served as chemistry department head, graduate dean, and director of the Research Institute. In 1963, Gerry went to Laramie to be Professor of Chemistry and Dean of the College of Arts and Sciences at the University of Wyoming (UW) . He has remained there serving in several capacities including Vice President for Research and Graduate Studies. Gerry officially retired in 1990, but has continued to work for UW and for a company he established which uses coal as a raw material (like oil), and refines it (like oil) to produce chemicals. He has remained active in the ACS in both the Wyoming Section and Rocky Mountain Region, in the Senior Olympics, and in local and state organizations, and he continues his great interest in science education.

Perhaps at age 96 one might be entitled to make some observations about the good, the bad, and the ugly aspects of aging. So let us start from the end and work forward. The ugly (let's face it) is growing old. One's physical and mental abilities are decreased; there may be some serious medical problems. Worst of all, one's contemporaries are fewer. I went to my 75th college anniversary last fall and I was the only one present from the class of 1940. In fact, there weren't too many present from the class of 1950. Frankly, it is somewhat depressing and makes one feel out of place. Even if I am able, I won't be going to my 80th college anniversary event.

The bad is the realization that one is old. I don't know when that occurs. With me it occurred right after I sold my Harley, which was at age 92. On my birthday, my dear wife plied me with a series of questions: Is your hand-eye coordination as good as it was forty years ago, are your reflexes as good as forty years ago, is your balance....etc. Since I couldn't answer one question affirmatively, the obvious conclusion was that I was too old to ride so I sold the bike. On the plus side, I hadn't broken any bones or scraped off any large areas of skin during the years that I had ridden. So the decision to quit the bike made total sense, but nevertheless at that point I realized that I was old.

The good fortunately outweighs both the bad and the ugly. And the good in my opinion, is self-generating. There is still a life to live. But to do so, one must keep active both physically and

mentally. Physically means daily exercise, walking (running, if at all possible), using the stairs rather than the elevator, etc. Physical health also means watching your weight, eating properly, and having an annual (or even semi-annual) check-up. Mental health is, of course, equally important. Those of us in academia are fortunate in that we can sometimes have some university office space with the necessary communication devices. Otherwise one should establish a home office. Thus, it is possible to keep up with one's field, if you wish to, and while probably not making many (if any) contributions, the satisfaction and mental exercise involved is very important. An active relationship with the American Chemical Society or other societies is another way to stay current. Many of us have hobbies (mine is collecting southwestern art), which are really learning situations, and are useful in remaining mentally active. Thus, mental exercise is as important as physical exercise.

In closing, please excuse what may be viewed as preaching. I am simply describing my recipe for dealing with the passing years. So be positive, be happy, do things and smell the roses!

This Newsletter often publishes accounts of the many and varied activities of senior chemists. The two articles following describe rather unusual outdoor activities. The first is about Dr. Mel Druelinger who obtained a B.S. at Indiana University and a Ph.D. in Organic Chemistry at the University of Wisconsin (Madison). He held faculty positions at Indiana State University, the US Air-Force Academy and Milliken University. Since 1984 he has taught at Colorado State University-Pueblo, where he is also a member of a mountain rescue team. The article was suggested and written by Mel's colleague, Dr. Sandra Bonetti, who is also a Professor of Chemistry at Colorado State University-Pueblo. The photo shows Mel on Pikes Peak. (Editor's note)



Organic Chemistry and Search and Rescue

What do organic chemistry and Colorado Mountains have in common? The answer is Mel Druelinger, an organic chemist and professor at Colorado State University-Pueblo (CSU-Pueblo), who is also a longstanding member of El Paso County Search and Rescue (EPC SAR), which is based in Colorado Springs, Colorado. For 36 years, Mel has served as a search and rescue volunteer for EPC SAR while on the faculty of the U.S. Air Force Academy and subsequently at CSU-Pueblo. This year, Mel's distinguished record of service on EPC SAR was recognized by the American Red Cross who gave him the 2016 First Responder Hometown Hero award for Southeastern Colorado. As a member of EPC SAR, Mel has served in many capacities including as field team leader, on-duty coordinator and incident commander and also on the training and planning committees and on its Board of Directors. He also enjoys speaking to school,

church and scout groups on topics such as how to keep safe in the woods and what to do when lost. He continuously undergoes training required for certification by the Mountain Rescue Association (MRA) and is skilled in technical rock and ice climbing, avalanche and snow rescues. Every five years, he and others in EPSCAR undergo a very rigorous two-day test for MRA certification which is monitored by evaluators in the Rocky Mountain Region. The test is very rigorous and addresses the challenges posed by the weather, altitude, and rugged terrain in the Colorado Rockies.

Mel finds search and rescue (SAR) to be very rewarding especially when saving lives or finding people who are lost. One of the most compelling rescues was the "Yale Christmas Miracle Rescue" which is detailed in the book *Mountain High Mountain Rescue* by Peggy Parr. A family of four's plane had crashed near Mt. Yale under severe winter conditions. Mel and his SAR team located the family, provided medical care overnight at the crash scene and then

evacuated the family in daylight. Other notable missions include rescuing four victims of a helicopter crash near Wolf Creek Pass and the 1993 rescue of seven skiers near Vail, which landed Mel on national media outlets including CNN, People and LA Times. On a yearly basis, Mel and the EPCAR team receive 150-170 calls per year, and since he joined EPCAR, Mel estimates that he has participated in 2000 search and rescue efforts. Mel is an emergency medical responder and has performed rescues and recoveries on many of Colorado 14,000+ foot peaks. From the time they receive a call, volunteers must be ready to respond in less than an hour, able to fly away on a Chinook helicopter from the Fort Carson U.S. Army Base, and carry all of the necessary resources to allow both the rescuer and the person(s) rescued to survive for 3 days in the Colorado Rockies. While most of EPCAR's activities are within Colorado, in the past they have served other western states.

How did Mel become a search and rescue volunteer? His path to search and rescue began in 1980 at the Air Force Academy, where he was a faculty member. While running on the Academy's trails, his running partner recognized that Mel's extensive mountaineering, hiking, backpacking, and running experience would be a valuable asset to EPCAR and invited him to train with the group. Mel's climbing *bona fides* are numerous. He has climbed (1) all 54 of the Colorado 14ers, (2) mountains exceeding 18,500 feet in altitude in five continents including Aconcagua in Argentina, which is the highest peak outside of the Himalayas, (3) the tallest peaks in three continents including Mt. Kilimanjaro in Tanzania and Mt. Elbrus in Russia, and (4) numerous other high peaks throughout Mexico and South America. As recently as 2011, Mel was trekking and climbing in Nepal. He visited the Mt. Everest Base Camp and area passes and mountains above 18,500 feet. He has also completed the Pikes Peak Marathon and Ascent a total of 19 times, a race that has a rise of 8000 vertical feet on a challenging trail.

In addition to answering the call of his beeper for search and rescue missions, Mel responds to the needs of the scientific community in a myriad of ways. At CSU-Pueblo, Mel relishes working with students and helping them become good scientists, chemists and researchers and as the (former) Dean of Graduate Studies and Research, he worked to ensure the success of graduate programs on campus. In 1999-2000, Mel was a program director/officer at NSF and continues to serve on many NSF grant review panels. He actively champions scientists at all career levels by organizing national ACS meeting symposia on starting successful research programs at primarily undergraduate institutions, and serving on the Council for Undergraduate Research (CUR) as a Councilor and as a planner, presenter, and mentor for the CUR Proposal Writing Institutes. It is a poorly kept secret that Mel does not know how to pass up an opportunity to help. Mel says "making a difference in the lives of others" is why he continues to serve others in the scientific and chemistry communities and on the mountains of Colorado.

Scuba Diving Under Ice *By Kenneth Welch*



Dr. Kenneth Welch obtained his Ph.D. from Marquette University and spent most of his working life as an analytical chemist, process chemist and project manager for S. C. Johnson & Son, Inc., Racine, WI. He retired in 2009 and has remained a part-time consultant. In semi-

retirement he resumed his interest in scuba diving, which he writes about below. He lives in Mount Pleasant, WI and is a member of the Milwaukee Local Section. In the attached photos, Dr. Welch is the diver in the black suit with the red triangle in the chest area.

In semi-retirement, I resumed my interest in scuba diving, which started more than 40 years ago. This involves Boyle's, Gay-Lussac's, and Dalton's Laws, the Joule-Thompson effect, heat transfer and thermal conductivity, and other topics very familiar to chemists.

As one descends in the water column, for every 34 feet of depth in fresh water (and 33 feet of depth in sea water) the surrounding pressure increases by one atmosphere. To the scuba diver, the consequence of Boyle's Law [volume varies inversely with pressure], is that air consumption is increased by a factor equal to the number of atmospheres of surrounding pressure. A diver who breathes 15 liters of air per minute at the surface can be expected to breathe the equivalent of 60 liters per minute at 100 feet (i.e. 15×4 (atm)).

The temperature of a gas varies directly with the pressure (Gay-Lussac's or Amonton's Law), and an additional effect comes into play when a gas expands adiabatically. When compressed air (from a compressed air tank at 3000 PSI) expands into the first stage of the scuba regulator the pressure decreases to 140 PSI. Some cooling of the air will occur, and it may cool the regulator and freeze it and stop it from working properly, in other words converting a working regulator into a "free flowing" regulator. This cooling is caused by the Joule-Thomson effect and is something that divers must watch out for since frozen regulators pose a serious risk. Consequently, some regulators are designed for use in very cold water, and divers carry an additional independent air supply.

Cold water diving (for example, under a frozen lake) usually means that the diver wears a dry suit inflated with the same gas as used for breathing. For air this works fine. However, some deep divers like to use helium and oxygen mixtures to prevent nitrogen build-up in tissues .

The thermal conductivity of helium is five times that of air. So, the diver will feel very cold because of the greater loss of heat from the body. However, argon has a heat capacity about one-half that of air, and may be used to inflate dry suits instead of helium when helium is used in the breathing mixture. In this way the diver's heat loss is reduced.

Divers can obtain breathing air that is enriched with oxygen, referred to as Nitrox in the industry. This mixture, also called "geezer gas," reduces the nitrogen content of the compressed air. Dissolved nitrogen in blood causes the "bends." Nitrox provides more oxygen per breath. However when using oxygen-enriched air a person could experience convulsions or other symptoms since the oxygen is at a partial pressure greater than 1.4 atmospheres. Dalton's law tells us, that an enriched air mixture of 40% oxygen will have an oxygen partial pressure of 0.4 atmospheres. However, if the diver were to descend to 100 feet breathing this enriched gas, the oxygen partial pressure would be 1.6 atmospheres, a potentially toxic mixture.

Scuba diving under ice may seem like a strange activity. I do this activity as part of an annual ritual with fellow recreational divers as well as part of the local county dive team. The water is usually much clearer under ice as there is no algae, runoff water or wave action to diminish visibility. If we are fortunate enough to have the snow blown off the ice and a cloudless sky, there is excellent illumination. We typically ice dive near a location where a location with normal room temperature is not far away. There is the potential for a freezing regulator, so proper maintenance and a separate tank and regulator are essential. Obviously precautions must be taken so the diver knows where the hole in the ice is, and stays near it. There is a line from a surface tender to the diver and signals are passed back and forth using tugs on the line. If these precautions are taken, ice diving can be a fascinating activity.

The two articles that follow are both about senior chemists and illustrate some of the many different career paths that a chemistry degree allows (Editor's note).



My Life as a Bioinorganic Chemist, Chemist, Scientist and Human Being

*By Eiichiro Ochiai: Professor emeritus, Juniata College (retired in 2005)
Currently living in Vancouver, British Columbia, Canada*

I taught chemistry in Japan, Canada, and the United States, and did some research in the field of bioinorganic chemistry in Canada, USA, Sweden and Germany. I started my research in Japan on the catalytic effects of transition metal complexes, and extended the research a little at Ohio State University as a postdoctoral fellow with Professor Daryl H. Busch. When I moved to the University of British Columbia, I tried to gather available information about the interactions between inorganic world and the bio-systems, and published it as a book: "Bioinorganic Chemistry, an Introduction" (Allyn and Bacon, 1977). It turned out that it was the first comprehensive book on the subject, and the international conference on the subject was started a few years later in 1983.

From then on, I intended to expand and also generalize the subject of bioinorganic chemistry, including the origin and evolution of life from the point of view of inorganic materials. I published another book on the subject: "The General Principles of Biochemistry of the Elements (Plenum press, 1987), while teaching at Juniata College, in Pennsylvania. After retiring from teaching at Juniata College, I decided to wrap up my career as a bioinorganic chemist, and so published yet another book on the subject: "Bioinorganic Chemistry, a Survey" (Elsevier, 2008).

I looked at myself, and realized that I am a chemist, and so I thought I need to wrap up my career as a chemist. The result was a book: "Chemicals for Life and Living" (Springer, 2011), which was targeted at the general public about the significance of chemistry. I thought this was it, the end of my career.

Then, Japan was shaken by the very strong earthquake and huge tsunami in 2011. It caused the serious accidents at the Fukushima dai-ich Nuclear Power Plants, about 250 km northeast of Tokyo, my birthplace. It shocked me, and woke me up as a scientist. As a chemist, I knew a little about radiation, but not much, and so I tried to learn more about the effects of radiation on living organisms. A result of such learning is a book: "Hiroshima to Fukushima: Biohazards of Radiation" (Springer, 2013). I have written two more books on the issue in Japanese. I have found not much has been published on the issue, and the reality of radiation effects on living organisms has been shrouded in a way. I am still pursuing the issue, because this is a critical matter for the survival of human beings as well as other organisms.

As I grow old, I have been looking at the current human civilization. I taught at Juniata College, PA, which emphasizes "Peace"; it is a college of the brethren, a peace church. That motivated me to look at issues beyond chemistry/science. After retiring from teaching in 2005, I became a contributor to a Japanese Internet journal. I have contributed more than 200 articles to it since 2007, on various issues such as economics, peace movements, and human civilization as a whole. I gathered several articles and put them in a book: "A Sustainable Human Civilization beyond the Current Corrupt Civilization" (in Japanese; Hon-no-Izumi sha (Tokyo), 2013). I translated a portion of it into English, and published it as Kindle e-book (http://www.amazon.com/gp/product/B007GGACSG?keywords=kindle%20book%20by%20Eiichiro%20Ochiai&qid=1449269491&ref_=sr_1_1&sr=8-

1).

I did not intend to write these books when I retired from the active profession, though the motivation for retirement was to get an extra time to complete the bioinorganic chemistry book. Luckily I had an opportunity to do so. Then I thought that I should do something to end my career as a chemist, if this is to end my career as a bioinorganic chemist. The interest in the radiation issues as a scientist came only accidentally, and led me to continue writing in other fields.

Chemistry - A Profession for All Seasons

By Peter D. Frade, Ph.D.

Peter Frade, currently at Wayne State University in Detroit, Michigan, describes the widely different careers made possible by a chemistry degree, and the application of chemistry knowledge in non-traditional fields.

In the 37 years since receiving my doctorate in chemistry from Wayne State University (WSU) I have come to realize that a degree in chemistry prepares a graduate for many different professions. As I look back over the different roles in which I have been engaged, I can personally attest to this fact.

I spent 28 years as an analytical chemist in the Department of Pathology and Toxicology of Henry Ford Hospital in Detroit, Michigan, specializing in toxicology. In 1996, I was invited back to WSU, my alma mater, as an Associate Professor to teach chemistry-related courses in the department of Mortuary Science (now the Department of Fundamental and Applied Sciences) within the Eugene Applebaum College of Pharmacy and Health Sciences. It was a very exciting period. As a new faculty member, I was asked to design specialized courses involving chemistry integral to specific fields such as Pharmacy Practice, Clinical Laboratory Science, Pathologists' Assistant, Forensic Science and Mortuary Science. In particular one course that I developed, titled "Biochemical basis of Pathophysiology", was added to the curriculum of both the Pathologists' Assistant (PA) and Clinical Laboratory Science (CLS) programs. It was also added to the courses listed under the specialized accreditation standards specified by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). I titled this course "Biochemical Basis of Pathophysiology." Over the years, it has become highly regarded in our department as it encourages enhanced recognition, by students in health professions, of the roles of chemistry and biochemistry in health and disease processes in the real world. Many students have commented on how they particularly valued the intensity of the course, as it fortified their understanding of disease diagnoses and other medical issues they encountered later in their professional careers.

Course Focus and Finer Nuances

This lecture-based course is designed to allow the PA and CLS student to focus on the roles of (1) the structural biochemical nature of carbohydrates, lipids, proteins, enzymes, and hormones; (2) metabolism in health and disease states; (3) bio-molecules that are of critical importance in health and disease; and (4) abnormal biochemistry leading to disease states. The students also research presentations and case studies from contemporary medical literature dealing with selected diseases and syndromes, and correlate biochemical defects with clinical observations.

The course is presented from a descriptive point of view and case reports, text readings, medical literature surveys and classroom discussions supplement lecture presentations. Topics cover defects in normal biochemistry underlying the pathophysiology of major organ systems. Students then go on to recognize and discuss concepts of basic clinical and medical biochemistry from a descriptive standpoint. They study defects in biochemical processes involving organ system pathophysiology, analyze clinical laboratory values and their

significance relative to pathobiochemical processes in diseases, clinical disorders or syndromes and critically assess clinical case reports to determine their biochemical mechanisms, as observed in clinical practice.

The course capstone is a set of group project presentations to faculty and students addressing the patho-biochemistry associated with rare diseases. I invite you to attend my course and witness, firsthand, the group dynamics and the chemistry, biochemistry and pathology involved.

What Does the Committee on Nomenclature, Terminology and Symbols (NTS) Actually Do? By Wayne Wolsey

Wayne C. Wolsey is a Professor Emeritus, of Macalester College in St Paul, Minnesota and a Councilor for the Minnesota Section. Dr Wolsey is an ACS Fellow. He is an Associate Member of the Committee on Nomenclature, Terminology, and Symbols, and discusses some of the work that this committee does, including a possible new definition of the mole and the kilogram.

This article describes the operation and scope of the NTS committee, and that of similar groups in other countries that work together to set standards used worldwide. It also discusses proposed new definitions of the mole and the kilogram.

The ACS has long had a committee dealing with nomenclature, establishing a committee on Nomenclature and Notation in 1886, just 10 years after ACS was founded. In 1911, the committee's scope was modified to Nomenclature, Spelling, and Pronunciation. Further changes led to the current NTS title. There has been a continuing relationship with Chemical Abstracts.

The responsibilities of the NTS Committee include (1) advising the ACS Council on such matters as usage of nomenclature, terminology, symbols and units; (2) coordination of such activities within the ACS; (3) consulting with and advising editors of ACS publications; (4) initiating, reviewing and recommending adoption of proposed documents, as appropriate; (5) establishment and continuation of liaison with other national and international organizations, committees and commissions with similar concerns; and (6) provision of a means for ACS members to participate in the consideration of these matters.

This broad charge involves a committee of 18 members, 7 associates, 2 consultants, and 26 "friends of the committee." Committee meetings are held at each ACS national meeting. Four subcommittees deal with Long-Range Planning, Communication and Outreach, Education and Liaison. The committee membership includes persons of all professional and educational levels from government, academia and industry. There are experts in various fields of nomenclature, terminology, symbols and units. We are currently establishing liaison relationships with several other ACS Committees and Divisions.

In addition, members of our committee either serve on or are in liaison with committees of the International Union of Pure and Applied Chemistry (IUPAC), the world authority on chemical nomenclature, standardized methods for measurement, atomic weights and related matters. IUPAC was founded in 1919, in the era of international harmony that existed after World War I. A need for agreements on organic nomenclature was the impetus for international meetings in Geneva (1892) and one as early as 1860 led by August Kekule. The official body representing the U.S. is the National Research Council of the Academy of Sciences, via its National Committee for IUPAC, which in turn seeks input from organizations such as the American Chemical Society and the National Institute of Standards and technology (NIST).

An NTS member was responsible for the writing and final editing of the 1,600 page

Mary Virginia Orna received her Ph.D. in Analytical Chemistry from Fordham University. Most of her career has been spent as Professor of Chemistry at the College of New Rochelle. She also formerly edited "Chemical Heritage" magazine and spent a year as a Fulbright Fellow in Israel. Nowadays she writes books, leads international study tours, builds websites, and teaches English in several European countries. She is a member of the New York ACS local section and the Divisions of History and Chemical Education. Here she discusses her book: "Science History: A Traveler's Guide"



Orna, Mary Virginia. *Science History: A Traveler's Guide*. American Chemical Society: Washington, D.C. and Oxford University Press: New York, NY; 2014.

Learning science through travel to sites where the science actually happened is a privilege available only since the latter part of the past century. Such travel can interface not only with the professional goals of chemists in academe, industry, and other areas of endeavor, but also can enhance the recreational travel of persons even mildly interested in science. In detailing places of scientific interest throughout Europe, Israel, and other non-European venues, this book can provide its readers with the following insights:

- Visits to places important in the history of science can provide teachers with interesting experiences to use in broadening their science curricula.
- The scientific and technological developments of other cultures, the materials they used, and the extent of international commerce in goods and crafts can impact on our own understanding of how science is taught and practiced in the USA.
- Even vicarious visits to faraway places of scientific interest can enrich the homebound or those unable to travel.
- It would be possible to plan a scientifically-oriented visit to a place not necessarily associated with science.
- It would be possible to plan a scientifically-oriented visit to well-known scientific sites armed with information not necessarily available on the internet or in guidebooks.

While the book is broadly scientific and treats areas other than chemistry, where appropriate, chemistry is the highlighted science. The book is also organized on the "base city" principle whenever possible: certain cities are hubs from which the traveler can branch out to other venues of interest. This is certainly true of London, Paris, Stockholm, and to a certain extent Prague and Vienna. Another strength of the book is that the authors of the various chapters have first-hand knowledge and in many instances, professional expertise, with respect to the history of the sites. For example, Robert Anderson, author of the chapter on Scotland, is former Director of the Royal Scottish Museum (and subsequently of the British Museum); Peter Morris, author of the chapter on London and Oxford, was curator of chemistry at the London Science Museum for almost all of his professional career; Marco Fontani, author of the chapter on Florence, is a native Florentine and member of the chemistry faculty at the University of

nomenclature of Organic Chemistry, IUPAC Recommendations and Preferred Names 2013, the new edition of the IUPAC Blue Book (a twenty year project). Projects are underway in other areas, including polymers, nanomaterials, flavonoids, enzymes, carbohydrates, and small molecules of biological interest. The Committee is interested in, and has representatives report on developments in SI (International System of Units), names for new elements, and metrology in chemistry and biology.

A controversial current topic, which has engendered considerable discussion, inside and outside the Committee, is one from the Consultative Committee on Amount of Substance—Metrology in Chemistry and Biology (CCQM), a part of the International Bureau of Weights and Measures (BIPM). This issue involves proposed redefinitions of the Mole and the Kilogram. There is a strong desire for many scientists connected with metrology to have all units defined in terms of a reference measurable physical constant such as the speed of light, rather than comparison with physical objects. The majority of readers will undoubtedly recall that for mass, there is a standard kilogram made of platinum and iridium at NIST (formerly the Bureau of Standards), a copy of the original International Prototype of the Kilogram (IPK) in Paris. A problem with these “standard kilogram masses” is that there appear to be mass changes, on the order of micrograms (ca. 50 $\mu\text{g}/100\text{ yr}$) thought to be due to atmospheric contamination or losses due to periodic “cleaning.” The CCQM and BIPM are recommending that the kilogram be redefined relative to Planck’s constant. One can obtain a value for the kilogram via an instrument (a watt-balance) that determines the velocity of a mass moving under the influence of gravity—both mechanical and electrical measurements [M. Stock, “Watt Balance Experiments for the Determination of Planck’s Constant and the Definition of the Kilogram”, *Metrologia* (2013), 50(1), R1-R16]. NIST, under the current leadership of Dr. Willie May, is at the forefront of watt balance development.

Similarly, the international committee is proposing that the mole (actually they prefer to talk about “amount of substance”) be defined in terms of the Avogadro “constant” instead of the present “amount of a species having the same number of units as atoms within 12.0000. g of carbon-12.”

The Committee has cosponsored symposia on various aspects of these issues at national ACS meetings since 2010. Articles have also appeared in *Chemical and Engineering News* [P.F. Rusch, “Redefining the Kilogram and Mole”, *C&EN*, (2011), 89(22), 58, May 11] and the *Journal of Chemical Education* [R.S. Davis, “What is a Kilogram in the Revised International System of Units (SI)?” *J. Chem. Educ.*, (2015), In Press].

Thus, it can be seen that the NTS Committee deals with items of interest not only for specialists but also items that are of interest to the greater chemistry community. Senior chemists can make contributions to all ACS committees. Anyone is invited to become a friend of the committee and/or attend, participate, volunteer, etc. at any of our sessions. Meetings are held on Monday afternoons at National ACS Meetings. Visitors are allowed at the Chair’s discretion. For further details, contact wolsey@Macalester.edu.

Science History

By Mary Virginia Orna

Florence; and Roland Adunka, Founding Director of the Auer von Welsbach Museum, beckons us to the wonderful little town of Althofen where one can enjoy Alpine views, medieval castles and cathedrals, and unique industrial sites along with a visit to his museum, which documents the incredible accomplishments of the nobleman and chemist who laid claim to discovering four elements. Hang onto your seats as you take off – you are in for a special treat!

www.maryvirginiaorna.net

We are introducing a new series to our Newsletter: short articles written by Senior Chemists about interesting places to visit when you are traveling. Some of them are not well known but are worth a visit. If you know of an interesting site, please submit a short article to the Newsletter. Our first two articles in this on-going series follow. (Editor's Note)

HALL OF FLAME MUSEUM, 6101 East Van Buren St., Phoenix, AZ,

By Tom Beattie, SCC Chair

The name may seem a bit corny and possibly not very descriptive, but when visiting or passing through the Phoenix, AZ area with some time to spare, consider spending a few enjoyable hours at this fire museum. From the website (www.hallofflame.org)

It has almost an acre of fire history exhibits, with more than 90 fully restored pieces of fire apparatus, dating from 1725 to 1969. Most of the exhibits are American, but they also have pieces from England, France, Austria, Germany and Japan. Also sponsored is the National Firefighting Hall of Heroes, which honors firefighters who have died in the line of duty or who have been decorated for heroism. The Hall includes a gallery dedicated to the history of fighting wildfires in the United States. We found a huge collection of firefighters' sleeve badges; a large retired fire engine and a municipal fire emergency call and dispatch station. Young children and grown-up kids of all ages seemed to be enjoying themselves when we visited. The website (see above) provides complete information about hours (open daily), directions, and admission charges.

The ACS Philadelphia Meeting: Places to Visit



By Al Denio

Al Denio is a member of the Delaware Section of ACS and a member of the Senior Chemists Committee. He has written several articles for the Senior Chemists Newsletter.

In August, we shall head for Philadelphia, a historic city on the east coast. Philadelphia has many fine museums and historic sites. Another option is to escape the crowds and head about 35 miles south to visit the famous Hagley Museum and Library in Wilmington. This is where DuPont was founded in 1802 on the banks of the Brandywine River. E.I. du Pont had come from France and founded the company to make gunpowder, based on his knowledge

and experience working for Antoine Lavoisier, the great French chemist.

The powder mills operated until 1921, using the waterpower of the river to grind the three ingredients – charcoal, sulfur and saltpeter (potassium nitrate) into a fine powder. In spite of considerable safety precautions, deadly explosions did occur. The museum covers 235 acres and includes Eleutherian Mills, a Georgian house that served as the family home overlooking the mills. Mr. du Pont could actually walk to work. A small bus provides a tour of the site, or you can enjoy a leisurely walk in the shade along the famous Brandywine River. You can visit the website at www.hagley.org. The phone number is (302) 658-2400.

A great second option is about one mile away on the other side of the Brandywine River. This is the Nemours Estate, the home that Alfred I. du Pont had built for his second wife, Alicia, between 1909 and 1910. It was modeled after Marie Antoinette's "Petit Trianon" at Versailles. The Estate includes 222 acres and has magnificent formal French gardens. Adjacent to the home is the famous A.I. DuPont Children's Hospital with its new modern addition. We enjoy taking visiting family members and friends to this amazing home. I do believe that A.I. du Pont founded the first "Man Cave" in the U.S. His large basement has a bowling alley, pool table, movie theater, game rooms, and a small ice cream plant. He had a reputation as a generous man of many talents. The Nemours Estate website is www.nemoursmansion.org. The phone number is (302) 651-6912.

ACS Member of 70+ Years Celebrates Chemistry Every Day

Elizabeth Weisburger, Ph.D., D.Sc., has had an extraordinary career in chemical toxicology. As an officer in the Commissioned Corps of the U.S. Public Health Service, Weisburger has done extensive work with carcinogenesis at the National Cancer Institute, authored numerous publications and won several prestigious awards, including the Hildebrand Prize and the Garvan Medal from the American Chemical Society.

But Weisburger is more than just a remarkable scientist; she is also a mentor and a community advocate. "I believe it is important to help people get an education," she says. To this end, she sponsors scholarships for college students, judges local science fairs, tutors middle school students and is also involved in promoting chemical safety.

Weisburger recalls how excited she was to join ACS when she was in graduate school. For 72 years, she has remained an active member: attending meetings, serving on committees, and funding research and programs such as [Project SEED](#). "I've always been faithful to ACS," Weisburger says proudly. Her generous support of ACS includes a [charitable gift annuity](#), which she recommends because "you get a higher rate of return." Financially and professionally, a charitable gift annuity is a safe, solid plan that offers a stream of income for the rest of your life, as well as an instrument with which you can help ensure a bright future for ACS educational programs.

What impact do you want to make in your lifetime? Find a charitable plan that lets you support the people and causes important to you. Whether you are considering a contribution to the American Chemical Society to see the benefits of your philanthropy today or plan to extend your philanthropy into the future, there are several gift arrangements available. Read more at www.acs.org/legacy.

Join the Senior Chemists Group on the ACS Network!

*By James L. Chao, Member of the ACS Senior Chemists Committee
& Councilor of the North Carolina Section*



We have developed a group for Senior Chemists on the ACS Network, and it is nearly fully functional for the posting of comments. To get started, it is best to first log into <http://www.acs.org>. It will require you to provide your username and password; otherwise you will need to register by giving your ACS membership number and creating a unique username and password. There are several ways to find the Senior Chemists Group. A more circuitous route involves searching from the [ACS Network](#). To get there, begin with the top navigation bar and click on Membership and Networks. Of many links, choose the ACS Network. Once you're on the ACS Network, you can enter the name of the group in the search view, OR you can go to browse on the top navigation toolbar and a drop-down of many places will be presented. Look for a place called [Senior Chemists](#). After you have logged in, you may choose to bookmark the group site. This will save you time the next time you visit the group. You can also go there directly at <https://communities.acs.org/groups/senior-chemists>.

The Senior Chemists Group has a few items at this point in time, so we are asking for comments and suggestions about features that you might like. Each item can be thought of as topic or subtopic of interest to senior chemist members. Currently, you do not need to be a senior chemist to view content in this group, only be an ACS member. This will be a great way to receive information about Senior Chemists activities, share information about your Local Section senior chemists' activities, and exchange dialogue about topics of interests to senior chemists. We encourage you to try it and send us your comments at silvercircle@acs.org.

News from Local Sections with Senior Chemists Groups

If you have a senior chemists' group in your local section, or are just beginning one, please send us a brief notice about your activities. (Editor's Note)

North Carolina (by Jim Chao)

The North Carolina senior chemists' group reports several activities, including a new networking opportunity between the Younger Chemists and the Senior Chemists, supported by an Innovative Project Grant from ACS. The kickoff event was held at the World of Beer in Cary, NC, and was a speed-networking event.



The group was also given an insider tour of the Global Headquarters of Cotton Incorporated in Cary, NC. Cotton Incorporated is a not-for-profit institution (largely funded by cotton producers in the US and world-wide), which conducts research into advancing technology for cotton textiles and also provides funding for collaborative research grants in U.S Institutions.

The group also toured Nomacorc Corporations Operations facility in Zebulon NC. Nomacorc is the world's leading supplier of synthetic corks used in still wines. Their product is a good example of how chemistry solved the problem of a diminishing supply of natural cork from trees.

Northeastern Local Section (by Michaeline Chen)

Michaeline Chen, using an SCC grant, has recently restarted the Northeastern Local section. The group is meeting for lunches in Needham, MA, sometimes with a speaker. They are considering further activities, and discussing how to attract other senior chemists to the group.

Minnesota Section (by Lynn Hartshorn)

The Minnesota Section Senior Chemist' group was started about a year ago using a small grant from SCC. They meet bi-monthly for (mostly self-paying) lunches, and usually have a mini talk: a 20-minute talk given sometimes by one of the seniors and sometimes by a visitor. Topics have included "The Future of Coal," "Dry Erase 101", "Composing Crossword Puzzles", and "Local Volunteer Opportunities for Scientists."

The Senior Chemists Committee was established on January 1, 2013 as a Joint Board-Council Committee and consists of 16 members and 7 associate members. The Committee will serve two constituencies within the ACS: (1) seniors who are still active either as full-time or part-time employees, consultants, or those who still wish to stay closely connected to the ACS and its spectrum of activities; and (2) younger members and students who have questions about a chemistry-based career or who have started careers, but are looking for guidance in how to progress. Their mission is:

1. To share with ACS members of all ages a rich variety of personal experiences and expertise gained over many years of professional service;
2. To foster interest and participation in the science of chemistry through community outreach, especially in grades K-12;
3. To act as science advisers/ambassadors for the purpose of cultural exchange at home and abroad;
4. To provide senior ACS members with challenging, diverse, and enjoyable professional experiences that enable them to contribute to the cultural experiences of their communities; and
5. To recommend policies that address issues of interest to senior chemists.

American Chemical Society | 1155 Sixteenth Street, NW | Washington, DC 20036
Copyright © 2016 [American Chemical Society](#) All rights reserved.

You are receiving this email because you are an ACS member
To ensure that you continue to receive our emails, please add us to your address book or safe list.
[Email Management](#) | [Unsubscribe](#)