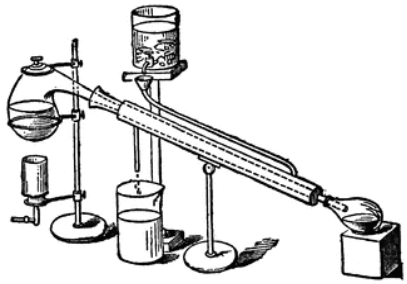
SOUTHWEST RETORT



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and Chemistry in this area

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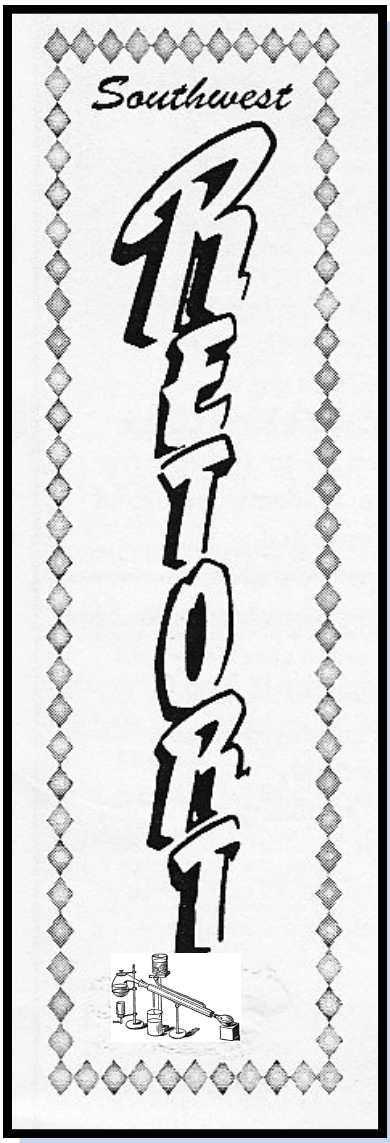

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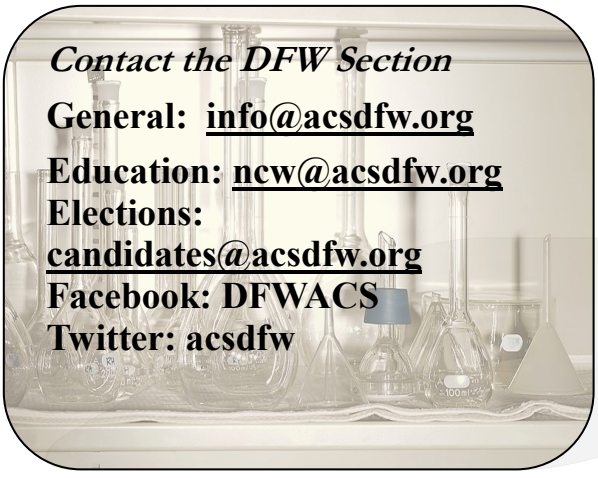

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The May ACS tour speaker will be **Dr. Johan Bjorksten** of Bjorksten Research Laboratories in Madison, WI. His topic will be "Some Problems Encountered in 25 years as an Independent Chemist."

The Southwest Regional ACS Meeting will be held in Austin Dec. 4-6 and hosted by the Central Texas ACS Section. The meeting will feature symposia on "Fundamental Processing in Gas Kinetics," "Physical Chemistry of Gaseous Fuels Oxidation," "Optical Studies in Surface Chemistry," "Digital Computers in Electrochemistry," "Application of Physical Methods to Biochemical Problems," "Molecular Biology," "Polymers: Fundamentals and Applications," and "Photochemical Processes."

The University of Texas at Arlington will offer a course of study leading to the Master of Arts degree in chemistry starting in Sept., 1968. This brings the number of graduate programs at UT-Arlington to 13. The University just started giving Bachelor's degrees in 1961, and in Aug., 1967, nine Master's degrees were granted in physics, mathematics, and engineering.

At the Mobil Field Research Laboratory in Dallas, the following individuals attended the Spring ACS Meeting in San Francisco: **Drs. J. C. Melrose, John Kelly, Jr., Peggy Dunlap, Donald E. Woessner,** and **E. Thomas Strom.** Melrose, Woessner, and Strom presented papers there. Austin College attendees at the San Francisco meeting were faculty members **Drs. F. C. Edwards** and **W. B. Guerrant** along with students **John Morris** and **James MacKay.** Other meeting attendees were, from TCU, **Dr. Clifford Venier** and **Dr. Manfred Reinecke**; from North Texas State, **Drs. W. T. Brady, T. Tidwell, L. Theriot, J. L. Carrico, P. Truitt** and **S. J. Norton.** At UT-Arlington Welch grants were received by **Dean Peter Girardot** and **Dr. Thomas J. Cogdell.**

Dr. Hulen B. Williams, head of the LSU chemistry department, has been named dean of LSU's College of Chemistry and Physics. At Texas Tech **Drs. W. C. Herndon, R. E. Mitchell,** and **J. A. Anderson** have received Welch grants. At Texas A&M **Dr. Ronald MacFarlane** has received a Guggenheim Fellowship for the 1968-69 academic year. Part of this time will be spent at the University of Paris.

At UT-Austin the Welch Foundation Lecturer in Chemistry was **Dr. George S. Hammond** from Cal Tech. **Dr. James Boggs** gave a paper at the Second Austin Symposium on Gas Phase Molecular Structure. **Dr. Allen J. Bard** gave an invited paper to the Faraday Society in Newcastle-upon-Tyne, England. **Dr. Royston M. Roberts** gave a senior seminar at Huston-Tilotson College. Dr. Roberts also recently received a three year Welch grant.

contributed by
E. Thomas Strom

And Another Thing...

Summer Practice

By Denise L. Merkle, PhD

Summertime! It's almost summertime. Granted, the full-time job thing doesn't quite bring the joy of release one feels at the end of a school year, but still. Sun, sand, waves – ahh. Summer doesn't fully free anyone from anything, really. Our perceptions rule us and our responsibilities do, too. What a disappointment these facts would be, if not for vacation and sun, sand and waves!

Even in the bliss of vacation we have work to do, you know. And it's work that's been discussed before: while you're paddle-boarding, hiking, lounging by the pool, gazing at the Eiffel Tower, mowing the yard, making endless grilled cheese sandwiches and icy pops – while you're summering, use a bit of your downtime to freshen your attitudes. Define an area of your belief system, whether it's how you view your life, your opinion of other people (especially those you don't know), your views on the unworthiness of scientists in fields other than your own, your convictions on what your offspring are supposed to do with their lives – whatever – and think about why this tenet is in your life. Why does this idea affect what you do, how you treat others, or what you utter? If the idea is obsolete, unhelpful, or downright hurtful, decide how it should be different —and change it.

Did this idea arise from a vacuum? Of course, it didn't! It arose from a very public incident in which a Chemist used a different scientific field in an attempt to belittle a fellow scientist. "But you're an ---ist", delivered in a condescending tone, was meant to convey that an ---ist was not as worthy as a Chemist, and to make the ---ist an object of pity. However, not only was the object of the insult a card-carrying, degree-holding chemist, we are all scientists together. The world needs many and varied skills, in case you haven't noticed. Especially in this multidisciplinary reality, when the author list can be the whole first page of the paper, just being a Chemist isn't enough. The idea that one type of scientist is better or worse than another, or that a field can be worthier is old school—archaic, even. Many nerds shouldn't sell, people with, um, unique spatial orientation (like mine) should not be structural engineers, those who pass out at the sight of blood may not wish to be in a medical field – the list of potential limits goes on, but the requirements for diverse abilities and collaborative efforts are greater.

So, gaze at hoot owls, try not to be blinded by your umbrella drink, dunk Cousin Ernie in the pool, or take Great-aunt Maudie a glass of lemonade, but realign your brain to accept the validity of others and their occupations and goals (unless you know as fact they're idiots, of course). Start the autumn with a more encompassing attitude toward humanity. And wear your sunscreen.

Around the Area

UT Arlington

Peter Kroll will have a faculty development leave during Spring, 2019. He will spend six months at the University of Trento in Italy."

Alejandro Bugarin was recognized with the President's Award for Excellent in Teaching on April 26th.

DFW Section

Kirby Drake, the DFW Section chair and the Chair of ACS Committee on Patents and related matters, had an article published in CEN (April 16, 2018). Entitled *Supporting Intellectual Property through Advocacy, education, and Awards,* it can be accessed at

https://cen.acs.org/acsNews/comment/Supporting-intellectual-property-through-advocacy/96/i16

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UNIVERSITY OF DALLAS

ADJUNCT POSITIONS AVAILABLE

PHYSICAL CHEMISTRY

The University of Dallas Constantin College of Liberal Arts seeks applicants for a Physical Chemistry Adjunct Faculty position for the 2018-19 academic year. Responsibilities would include instructing undergraduates in Physical Chemistry lecture and undertaking Physical Chemistry laboratory grading. A master's degree in Physical Chemistry is required with a doctorate degree in Physical Chemistry preferred. Teaching experience is preferred.

FORENSIC CHEMISTRY

The University of Dallas Constantin College of Liberal Arts seeks applicants for an Adjunct Faculty position for the 2018-19 academic year. Responsibilities would include instructing non-science undergraduates in Forensic Chemistry lecture and working with our laboratory coordinator to assign grades. Lecture in the fall will be on Tues. and Thurs. evenings from 7 P.M. until 8:20 P.M. Spring hours are negotiable.
A master's degree in Chemistry is required with a doctorate degree in Chemistry preferred. Teaching experience is preferred.

APPLICATIONS: Interested parties for either position should provide a Cover Letter, CV, and unofficial transcript through the Wufoo website at:
https://udallas.wufoo.com/forms/faculty-application-for-employment/
Applications will be accepted until the position is filled.

Once you have submitted your credentials, please e-mail me at the address below to notify me of your interest. Thank you for your consideration.

Sincerely,

Scott Boegeman, Ph. D.
Chair, Dept. of Chemistry
Director, O'Hara Chemical Sciences Institute
University of Dallas
boegeman@udallas.edu
972-721-5013

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51st Annual ACS-DFW Meeting-in-Miniature

The 51st Annual Meeting-in-Miniature was organized and hosted by the Department of Chemistry, Southern Methodist University, on April 21, 2018. Sessions 1 and 2 were undergraduate, and 3-7 were graduate sessions. Over 100 students participated in the M-i-M; the complete booklet, with abstracts, is included as an addendum to this issue of the Southwest Retort.

PRIZE WINNERS

Session 1 Undergraduate I

FIRST-tied

Kevin Huynh, UT Dallas

Implication of Disulfides in the Solvent Stability of Qβ Virus Like Particles

Nathanael Lutz, Baylor University

High Performance Liquid Chromatography Analysis of the Bioreductive Cleavage of Prodrug KGP372 to Its Effector Anti-cancer Agent Combretastatin A-4

SECOND-tied

Sanjana Ravi, UT Dallas

Synthesis of Silica Centipede Nanoparticles for Drug Delivery Purposes

Dakotah Martinez, Abilene Christian University

Novel Methods for Surface Patterning DNA Curtains

Session 2 Undergraduate II

FIRST

Bhargav Arimilli, UT Dallas

Thermoresponsive Behavior in a Novel Family of Single Crystal Alkoxyphenyl N-Substituted Naphthalene Diimide Derivatives

SECOND

Gino Occhialini, UT Dallas

Structural Approach to Predict the Formation of Well Ordered Boronate Ester Based Covalent Organic Frameworks

THIRD

AnnaBeth Thomas, Austin College

Exploration of Metal-Templated Organogelators for Use in Dye-Sensitized Solar Cells

Session 3 Biological

FIRST

Philip Palacios, UT Arlington

Single Amino Acid Substitution in Miae Shows Unique Shift in Chemical Reactivity towards Aryl-N-Amine Oxidation

SECOND

Maria Castaneda, UT Dallas

Inhibition of Cancer Metastatic Progression: Targeting FOXC2 and the Epithelial Mesenchymal Transition

THIRD

Aditi Nagar, SMU

Study of LOV Domain Chemistry of Brassica Rapa and Understanding their Role in the Crop Productivity

Session 4 Computational

FIRST

Arshad Mehmood, TCU

An Orbital-Overlap Complement to Atomic Partial Charge

SECOND

Shariq Haseen, UT Arlington

DFT Study of Surface Transformations between A-Cristobalite and Stishovite

THIRD

Sadisha Nanayakkara, SMU

A New Way of Studying Chemical Reactions: A Hand-In-Hand URVA and QTAIM Approach

Session 5 Inorganic

FIRST

Christopher Ozigagu, UNT

Sweet Corrosion of Ni-Mo Alloy Coating in High Salt and Gas Hydrate Temperature

SECOND

Darrell D. Mayberry, UNT

Synthesis and Resolution of Chiral Metal Clusters

THIRD

Samantha Brewer, TCU

Structural and Electronic Properties of High-Spin Iron Azamacrocyclic Complexes that Increase Direct C-C Coupling Efficiency

Session 6 Organic I

FIRST

Hamilton Lee, UT Dallas

pH Mediated Cell Uptake of Alkyl Carboxylate Functionalized Qβ VLPs

SECOND

Whitney Cosey, UT Dallas

Age Reduction in Carbon Molecular Sieve Membranes Formed From Copper Acetate/ Polybenzimidazole Mixed-Matrix Membranes

THIRD

Luke Ryan, SMU

Hycl-3: A Reaction Based Chemiluminescent Probe for Nitroreductase and Hypoxia In Vivo

Session 7 Organic II

FIRST

Parham Asgari, UT Arlington

Hydrogen Atom Transfer from Hydrosilanes by Lewis Base Catalysis

SECOND-tied

Vasanthy Karmegam, UT Dallas

Linear and Star-like Functionalized Polycaprolactones Micellar Systems for Doxorubicin Delivery

Jian Cao, SMU

A Chemiluminescent Probe for Cellular Peroxynitrite Using a Self-Immolative Oxidative Decarbonylation Reaction

CONGRATULATIONS TO ALL THE M-i-M WINNERS!

From the ACS Press Room

Rabies trick could help treat Parkinson's Disease

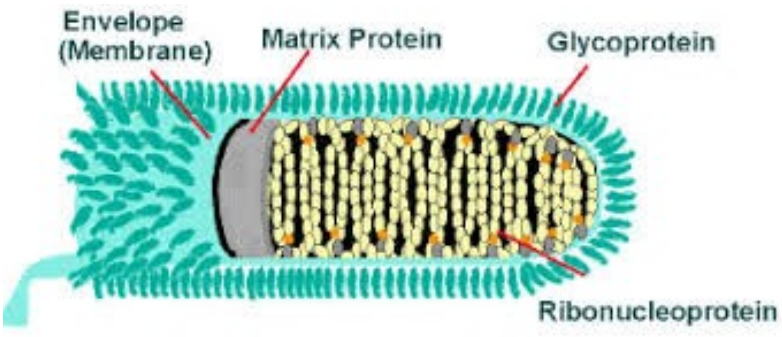
Targeted Brain Delivery of Rabies Virus Glycoprotein 29-Modified Deferoxamine - Loaded Nanoparticles Reverses Functional Deficits in Parkinsonian Mice

ACS Nano

The rabies virus wreaks havoc on the brain, triggering psychosis and death. To get where it needs to go, the virus must first trick the nervous system and cross the blood brain barrier — a process that makes it of interest in drug design. Now, scientists report in *ACS Nano* a way to exploit the rabies virus machinery to deliver a Parkinson's disease medication directly to the brain.

Parkinson's disease, the slow degeneration of the brain cells that control movement, affects about a million Americans, according to the Parkinson's Foundation, and has no cure. While the exact cause of Parkinson's disease is unknown, a common feature of the illness is the accumulation of iron in neurons, inflicting damage and cell death. Some doctors are now using a metal-grabbing compound called deferoxamine to sop up the excess iron in patients, but high doses are needed due to the drug's limited capacity to enter the brain, bringing on serious side effects. To lower the effective dose, Yan-Zhong Chang, Xin Lou, Guangjun Nie, and colleagues wanted to take advantage of a key part of the rabies virus to usher deferoxamine into the brain.

Glycoprotein 29 is a part of the rabies virus that binds to a brain cell receptor and crosses the blood brain barrier. The researchers attached glycoprotein 29 to a nanoparticle stuffed full of deferoxamine. Then, they injected the iron-grabbing nanoparticles into mouse models of Parkinson's disease. The iron levels in the mouse brains dropped, reducing the brain damage and reversing the disease symptoms, without noticeable side effects. Since all of the components in the therapeutic agent are already approved for use in the clinic, the researchers are looking toward human trials.



The authors acknowledge funding from National Natural Science Foundation of China, the National Distinguished Young Scientists program, the Innovation Research Group of the National Natural Science Foundation, the Key Research Project of Frontier Science of the Chinese Academy of Sciences, Queensland–Chinese Academy of Sciences Collaborative Science Fund and Beijing Mu-

From the ACS Press Room

Synthesizing a deadly mushroom toxin

Synthesis of the Death-Cap Mushroom Toxin α-Amanitin

Journal of the American Chemical Society

The death-cap mushroom has a long history as a tool of murder and suicide, going back to ancient Roman times. The fungus, Amanita phalloides, produces one of the world's deadliest toxins: α-amanitin. While it may seem ill-advised, researchers are eager to synthesize the toxin because studies have shown that it could help fight cancer. Scientists now report in the *Journal of the American Chemical Society* how they overcame obstacles to synthesize the death-cap killer compound.

α-Amanitin achieves its impressive deadliness by acting as a potent inhibitor of RNA polymerase II, the enzyme primarily responsible for transcribing genes into the messenger molecule RNA. Using α-amanitin bound to antibodies against tumor molecules, cancer researchers have reportedly cured mice of pancreatic cancer. These conjugates are currently in human trials; however, the only way to obtain α-amanitin so far has been to harvest mushrooms, which is time-consuming and results in relatively small amounts of the compound. Synthetic production approaches have been hampered by α-amanitin's unusual bicyclic structure, among other tricky features. David M. Perrin and colleagues decided to take on the challenge to produce the toxin in the laboratory, once and for all.

The researchers had to work through three key obstacles to produce α-amanitin in the laboratory: production of the "oxidatively delicate" 6-hydroxy-tryptathionine, the an enantio- selective synthesis of (2S,3R,4R)-4,5-dihydroxy-isoleucine and a diastereoselective sulfoxidation to favor the (R)-sulfoxide. Due to its toxic nature, the researchers limited production to less than a milligram, but based on their results, they are confident that good yields are can be readily obtained by scaling up the process. The researchers also say that the development of this synthetic route will enable chemists to attenuate the toxicity and potentially improve α-amanitin's activity against cancer, something that is only made possible by the use of synthetic derivatives.

The authors acknowledge funding from the Natural Sciences and Engineering Research Council of Canada, the Canadian Institutes of Health Research and the Canadian Cancer Society.

INTERVIEW WITH ACS PRESIDENT-ELECT BONNIE CHARPENTIER

Interviewed by

E. Thomas Strom

Presidents of the ACS represent you and me to the public at large, while doing their best to better the lot of the chemist. This is a tough task, but these are bright, committed people who strive to be an attractive, effective representative of our society and profession. This is the 15th time I have done one of these interviews. Fourteen of the 15 interviews were done at the president-elect stage. Bruce Bursten was the only one who evaded me as president-elect, but I caught him the next year when he was president. My first interview of this type was with Dallas resident Bill Carroll, who described the process as follows: "Tom, you are interviewing these people before reality sets in." What does he mean by that? My guess is that each president-elect wants to accomplish a lot during their three years in the presidential sequence, but the complexity of the situation limits what can be done. If you are steering a large ocean liner, you can't expect to do a 90 degree turn quickly. However, a five degree adjustment in direction may lead the boat to a better destination. The important result from these interviews is that we can see what is significant to that particular president and can aid him/her in achieving it, if we so desire.

Bonnie Charpentier is a native Texan, born in Orange and receiving both her B.A. and Ph.D. degrees from the University of Houston. Her last name is clearly French, and the French pronunciation would be "char pen tee a." The English pronunciation would be "car pen ter," and when she moved to Cincinnati to work for Proctor and Gamble, she settled on that pronunciation. It might surprise you readers to know that neither of her degrees is in chemistry. Her B.A. was in anthropology, and her Ph.D. in plant physiology.

She began our March 18th conversation by stating her focus would be on matters that were actionable. For example, regarding jobs, most of the new jobs are going to be in small companies, and those companies do not normally come to ACS meetings to recruit. She has been talking to YCC (Younger Chemists Committee) about looking for a crowd-sourced solution, some way to get communication in a more accessible way. This is an issue not only for younger chemists but for mid-career chemists as well. More than half the jobs at small companies are filled by word-of-mouth efforts. Networking in a local section tells what is available in that section, but could we push that information into a central source that other people could see---that would be very useful.

We briefly discussed the "ACS Report on the Present Employment Status of Chemical Professionals in the United States," written by a task force chaired by Donna Nelson and Attila Pavlath. An important conclusion of the report is that there is clearly no need for an increase in the absolute numbers of chemists. Bonnie said that she disagreed with that finding. She feels there is always a need for chemists, because it is such a fundamental science; it teaches you to think. She cited her own experience. Her current job deals with regulatory affairs, quality control, drug safety, etc. She rarely gets near a laboratory but she uses her analytical chemistry skills every day. She is using what she learned in a different way. She pointed out that where the jobs are now can change very quickly.

When she graduated with her degree in plant physiology, she was effectively an analytical chemist, because of all the natural products chemistry she had done. At that time, all the jobs were in the oil industry with very little available for analytical chemists. Fast forward to her time with Proctor and Gamble. She was part of a team that the P&G recruiting office set up to visit students in schools to encourage them to go into analytical chemistry. There were lots of jobs in analytical chemistry at that point; but that, too, changed. She thought we should tell students to train for a job you can love, but keep yourself malleable to allow for jobs that you might love even more. Finally, work on the soft skills that help keep you marketable. Working as a team is something that you don't usually get acquainted with in graduate school.

She gave an example from her own career as to how the job market can change. Between her undergraduate and graduate training she took a job for a year at a small oil service company, Horvipz Laboratory. She did a number of analyses of soil samples, which were interesting. She developed analytical skills and learned how to deal with large amounts of data. At that time a career in the oil industry looked good, but it wasn't what she wanted to do. A few years later those oil jobs had disappeared.

About this time in our interview I decided to find out how a B.A. in anthropology led to her chemistry career. Bonnie mentioned

that she was into science at a very young age. She originally wanted to be an ethnobotanist, people who understood how plants were used for medicinal purposes. Her father could make tea that was good for respiratory problems from green plants that he knew. The plant physiology she went on to study was how the chemistry and biochemistry of these plants impacted their physiological effects. In graduate school she focused on pine trees in a project funded by NASA. Her piece of the grant was to grow little pine trees in high gravity conditions. The idea was that, when plants were sent into space in zero gravity conditions, there would be base line conditions for comparison. There definitely were zero gravity effects. She had a second mentor for her project, Stan Deming in the Houston chemistry department, who was a fine analytical chemist. When she got a job offer from Proctor and Gamble as an analytical chemist, she told them she was not a card carrying chemist. They responded that what they needed were people who could solve problems. And so she was. She views herself as more of a generalist than a specialist.

She stated that you don't snooker kids into going into chemistry just to get a job. You try to give them at any time an objective view of what the marketplace is like. Getting an academic position in a Tier 1 university is really hard; getting a teaching position at the two year community college is easier. She personally believes that every individual should get a job that they love, but they should also be adaptable because you may change what you love. She loves what she does in regulatory affairs, because there are chemical aspects to almost all of the steps in the process.

2018 ACS president-elect candidates, Willie E. May and Bonnie A. Charpentier

Bonnie has worked with a lot of ACS presidents during her many years in ACS leadership positions. She believes it is hugely important to have people who work together to build sustainable programs. She feels she is lucky in that she is following two people whose programs she would like to build on. She thinks that the times we are in demand that we be better with our advocacy efforts, not only with the public but with Congress. We should also do more at the state level. We regret that we don't have scientists in Congress, but we have done diddly about it. We should provide tools for our members who are interested in running for office, from school board to Congress or anything

in between. She doesn't want this done on a partisan basis. In the US Congress we have one physicist and one chemist---that's it. She laments that rational thought in today's climate is seen as political, while it is only rational thought. If there is any time for us to stand up for science and rationality, now is the time. Bonnie thinks it is very important to continue the efforts started by Allison Campbell on how to positively interact with your Congressional representative, but such outreach should be expanded to the state level. We don't really have the ACS staff to do this, but we could partner with the state universities, who would have the same interests as we do. Again, this is not a partisan matter. We could rally our members to be helpful in those states in which there are issues in science education.

As usual, we have a very articulate, intelligent individual in the ACS presidential succession. I think the next few years will see challenges to the scientific enterprise. Evidence based results will come under increasing pressure. ACS members should do our part to help Bonnie and her successors hold high the standards of science.

Nominations are invited for 2018 Wilfred T. Doherty and Werner Schulz awards

Nomination forms and additional information are available online at http://dfw.sites.acs.org/localsectionawards.htm. Nominations are due by May 15, 2018. Each nomination should contain completed nomination form, cover letter highlighting the nominee's accomplishments, and a copy of the CV. One seconding letter may accompany nominations. The nomination package should be sent by email as a single pdf file to Stephen Starnes (Stephen.Starnes@tamuc.edu). Nominations remain active for five years but should be updated annually.

The Doherty Award is given for excellence in chemical research or chemistry teaching, meritorious service to ACS, establishment of a new chemical industry, solution of pollution problems, and advances in curative or preventive chemotherapy. Nominees may come from industry, academia, government, or small business. The nominee should be a resident member in the area served by the DFW Section, and the work should have been done here. The award is $1500 and an engraved plaque. A photo of the Doherty Award winner will be displayed permanently in the Gallery of Doherty Award winners, Berkner Hall, UT-Dallas.

The Schulz Award is given to high school chemistry teachers, who, like the late Dr. Werner Schulz, bring that something extra to the teaching of chemistry. The nominee and/or nominator need not be ACS members. Nominees should show excellence in chemistry teaching as demonstrated by testimonials from students and fellow teachers, results in student competitions, and diligence in updating and expanding scientific/teaching credentials. A photo of the Schulz Award winner will be displayed for one year at the Perot Museum of Nature and Science in Dallas, and then displayed permanently in the Gallery of Schulz Award winners, Science Bldg., Tarleton State University. A traveling plaque stays at the winner's high school for the year of the award. Winners will normally receive their awards and give their lectures at a fall meeting of the section.

Remember, a continuous flow of nominations is needed to maintain the quality of awards.

From the ACS Press Room

Sunlight works against oil clean-up efforts

Photochemical oxidation of oil reduced the effectiveness of aerial dispersants applied in response to the Deepwater Horizon spill

Environmental Science & Technology Letters

Oil spills, whether minor leaks or major environmental disasters, are bound to happen. Chemical dispersants are one of the tools that can help mitigate the impact of such spills, but they become less effective as oil weathers in the environment. Now, one group reports in *Environmental Science & Technology Letters* that sunlight has a much greater impact than previously thought on the effectiveness of these dispersants.

According to the U.S. Environmental Protection Agency, 10-25 million gallons of oil spill each year in the U.S. In large marine oil spills, chemical dispersants are often used. Dispersants break up floating oil into small droplets, which can be eaten by microbes or fall onto the soil at the bottom of the body of water, decreasing the risk of oil accumulation on shorelines. As spilled oil floats on the water's surface, it undergoes weathering processes, such as evaporation and emulsification, in which the oil forms a temporarily stable mixture with water, making chemical dispersants less effective. These are the major processes currently taken into account in field manuals and oil spill response guides for responders. According to these resources, photochemical oxidation, or chemical changes to the oil in response to sunlight, is a minor factor.

However, in recent research, Collin P. Ward and colleagues determined that photochemical oxidation is a dominant weathering process. Now, these researchers wanted to examine how sunlight impacts the effectiveness of dispersants.

In the laboratory, the researchers analyzed samples of oil from the Macondo well, which was the location of the Deepwater Horizon spill in 2010. They confirmed that simulated sunlight has a larger impact on the oil's properties than evaporation. In addition, dispersant effectiveness or performance decreased four-fold more when oil was exposed to sunlight than it did when the oil underwent evaporation in the absence of sunlight. To examine effects in the field, the team combined their estimates of how fast sunlight oxidizes oil with speeds of oil floating in the Gulf of Mexico and the locations of 412 aerial applications of dispersants on the Deepwater Horizon spill. Based on these data, the researchers say that many of the applications targeted oil that had undergone photochemical oxidation that lowered the dispersant effectiveness below 45 percent, which is below the threshold set by EPA for dispersants to be used in a spill. The team recommends that the effects of sunlight be considered in future field manuals and oil spill response guides for responders.

The authors acknowledge funding from the National Science Foundation, the Gulf of Mexico Research Initiative, the Deep-C Consortium, the Clark Family Foundation, Inc. and the U.S. EPA.

From the ACS Press Room

Harvesting water from fog with harps (video)

Fog Harvesting with Harps

ACS Applied Materials & Interfaces

As summertime draws near, some people around the U.S. will face annual water usage restrictions as water supplies become strained. But for those who live in arid climates year-round, water shortages are a constant concern. In these areas, residents must capitalize on even the smallest bit of moisture in the air. Now researchers report in *ACS Applied Materials & Interfaces* that they have developed a type of "harp" to harvest fresh water from fog.

According to the World Wildlife Foundation, as much as two-thirds of the world's population could face water shortages by 2025. To combat this, fog harvesting is used to collect fresh water in dry climates. Current methods involve setting out a mesh netting with vertical and horizontal wires to catch water droplets, which then fall into a collector. If the wire mesh is too coarse, it cannot effectively capture water, but if the wire mesh is too fine, it gets clogged easily. Coatings and lubricants have been applied to the mesh to prevent clogging, but they don't last and can leach into the water, contaminating it. Although previous studies have tested harp-like structures for this application, the researchers had not optimized the harps, nor had they compared their performances to mesh devices. So, Jonathan Boreyko and colleagues wanted to take those extra steps.

The researchers made three harp prototypes with uncoated vertical wires of three different diameters pulled taut on support frames. They then compared these harps with uncoated meshes that had nearly the same thicknesses. The water collection efficiency decreased for meshes with fine wires as they became clogged. But the efficiency rose with smaller-diameter wires in the harps because of a reduced pinning force of the droplets being shed along the same plane as the wires. In addition, the harps consistently collected more water than the equivalent meshes at all wire diameters. In fact, the fog harp with the finest wires collected more than three-times the amount of water of the finest mesh. The researchers also showed that the harp could be scaled up to a real-world size.

The authors acknowledge funding from the Institute for Creativity, Arts, and Technology at Virginia Tech and the Department of Biomedical Engineering and Mechanics at Virginia Tech.

VIDEO

https://www.acs.org/content/acs/en/pressroom/presspacs/2018/acs-presspac-april-18-2018/harvesting-water-from-fog-with-harps-video.html

DFW Section: May Meeting

Presentation and Tour

US Patent and Trademark Office (USPTO)

Regional Office

6 pm, Tuesday, May 22, 2018

USPTO - Texas Regional Office

Terminal Annex Federal Building

207 S. Houston St., Ste. 159

Dallas, Texas 75202

Click here for more information and to purchase tickets!

https://www.eventbrite.com/e/acs-dfw-section-uspto-tour-and-presentation-tickets-45740803976

Registration deadline May 20

Please join the ACS DFW Local Section for a tour and presentation at the Texas Regional Office in Dallas.

The USPTO staff (including a chemistry-related patent examiner) will provide a presentation, and tours of the USPTO -Texas Regional Office also will be provided.

Dinner will be catered by Celebration Restaurant.

More information about the USPTO - Texas Regional Office, including parking information, may be found at https://www.uspto.gov/about-us/uspto-locations/dallas-tx/dallas-texas. Street parking also should be free by 6 pm.

From the ACS Press Room

Cleaning up aquatic pollution with mussels

Cultivation of the Ribbed Mussel (Geukensia demissa) for Nutrient Bioextraction in an Urban Estuary

Environmental Science & Technology

Scientists and activists alike have been looking for a solution to the problem of aquatic nutrient pollution. Now one group reports in *Environmental Science & Technology* that ribbed mussels are up to the clean-up challenge.

When it comes to nutrients, like nitrogen and phosphorus, too much of a good thing can be bad. These nutrients end up in rivers and streams as the result of human activities and can cause algal blooms, loss of seagrass and low oxygen levels, which can lead to large numbers of fish and other organisms dying. Many studies have examined how to prevent this runoff, but not much attention has been paid to removing the nutrients from the water. Some agencies have started programs to do this, and they are using shellfish to filter out unwanted substances. *Geukensia demissa*, known as the ribbed mussel, is one type of shellfish proposed for these programs. This mussel lives in various habitats and can filter bacteria, microalgae, and detritus containing nutrients and contaminants. In addition, this shellfish is not for sale on the commercial market, so these mussels aren't directly consumed by humans. To see whether *G. demissa* could clean up dirty water in an urban environment, Julie Rose, Eve Galimany and colleagues conducted a pilot experiment.

The team equipped and deployed a raft stocked with local ribbed mussels in late June 2011 in an estuary at an industrial setting near New York City. The raft is a floating platform with beams and underwater ropes to which the mussels attach. The next spring, the researchers harvested the raft and studied the mussels. Overall, the mussels were healthy, and their tissues had high amounts of a local nitrogen isotope, indicating that they removed nitrogen from the water. Based on their study, the group estimates that a fully stocked raft would clean an average of 3 million gallons of water and remove about 350 pounds of particulate matter, like dust and soot, daily. In addition, they also determined that 138 pounds of nitrogen were potentially removed when the animals were harvested.

The authors acknowledge funding from the New York State Office of the Attorney General and National Oceanic and Atmospheric Administration's Office of Aquaculture.

From the ACS Press Room

Pepper plant sops up personal care product antibiotic

Transformation, Conjugation, and Sequestration Following the Uptake of Triclocarban by Jalapeno Pepper Plants

Journal of Agricultural and Food Chemistry

It sometimes can be hard to find toothpastes, soaps and other toiletries without antibiotics. Their popularity has caused an increase in environmental levels of antimicrobial substances, such as triclocarban (TCC), which end up in the water and soil used to grow crops. Scientists report in the ACS' Journal of Agricultural and Food Chemistry that TCC and related molecules can end up in food, with potentially negative health effects.

The U.S. Food and Drug Administration recently banned TCC from soaps because of questions about its safety and efficacy. Yet, TCC remains in many other products. It's also found in high concentrations in treated wastewater that is sometimes used to irrigate crops. The impact of TCC on human health remains unclear, but it may act as an endocrine disruptor. One obstacle to better understanding the risks of environmental TCC exposure is uncertainty about how much of it ends up in plants, and how plants metabolize the substance. So, Dawn Reinhold and colleagues undertook a study with jalapeno peppers to address this knowledge gap.

To track the antibiotic's journey from water to pepper, the researchers labeled TCC with radioactive carbon (C14). They grew the pepper plants hydroponically and, after 12 weeks, sampled the C14 content in the roots, stems, leaves and fruit. While the pepper fruit itself had relatively low levels of TCC, it contained a hefty portion of C14 in molecules that started out as TCC but then were converted to other molecules by the plant. According to the researchers, this finding indicated that the plant was metabolizing the antibiotic, and the health impact of these metabolites would need to be taken into account to fully assess the safety of TCC consumption.

The authors acknowledge funding the National Institute of Food and Agriculture within the U.S. Department of Agriculture, the National Science Foundation and the Vietnam Education Foundation.

From the editor

Congratulations to the winners in the 51st Meeting-in-Miniature of the DFW section. However, all participants should be commended for taking part in this annual event. The importance of standing up and presenting a brief overview of one's research is a valuable asset and cannot be overrated. This year's M-i-M had over 100 participants, both undergraduate and graduate, and an impressive array of topics. The program booklet, including abstracts, is appended to this Retort.

It is not too late to get in a nomination for the Doherty or the Schulz award (info on page 18).

Jalapenos concentrate antibiotic. Mussels (not the kind you eat) clean up dirty water. A glycoprotein on the rabies virus tricks the blood brain barrier in letting it through—and can be used to facilitate movement of other drugs through the barrier. Fog harps—although this sounds poetical, it is exceedingly practical. We can "harvest" the water in fog by allowing it to precipitate on wires and drain into tanks. There is always something new and fascinating in science (as the M-i-M participants demonstrated).

This is the last issue of the 70th year of the Southwest Retort, but we'll be back in September. Have a good summer!

Best regards,
Connie

APPENDIX

Dallas-Fort Worth Section of the American Chemical Society

51st Annual Meeting-in-Miniature

Saturday, April 21, 2018

Technical Program and Abstract Booklet

Organized by

The Department of Chemistry

SMU | DEDMAN COLLEGE OF HUMANITIES & SCIENCES

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Or copy and paste into your browser

https://issuu.com/dfwacs/docs/51st_acs_dfw_mim_at_smu_updated_tec