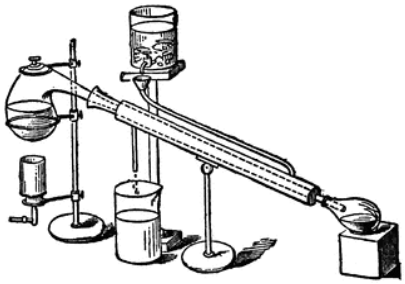
SOUTHWEST RETORT



SEVENTY-FIRST YEAR **SEPTEMBER 2018**

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and Chemistry in this area

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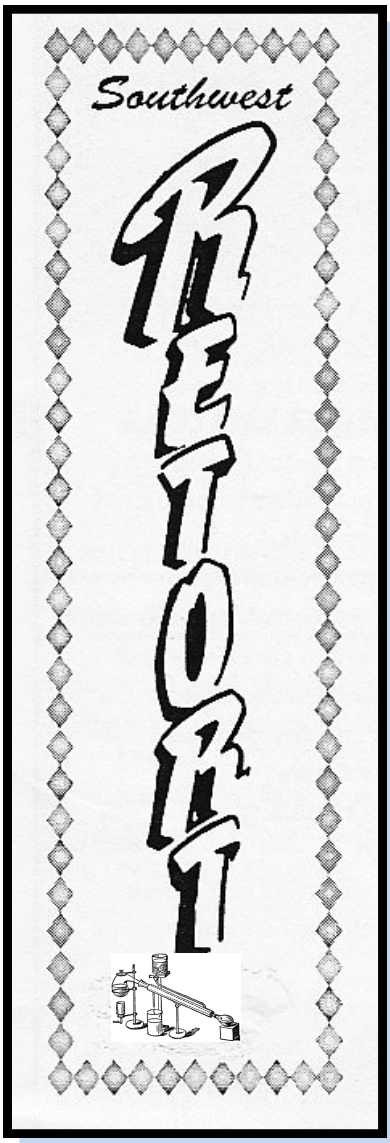

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

First Dallas-Fort Worth ACS Section Meeting-in-Miniature. Dr. C. Gordon Skinner of North Texas State University (NTSU) reported on the first Meeting-in-Miniature held in our section. The judges for the event were **Jack D. Reynolds** of General Dynamics, **W. A. Padgett** of Alcon Labs, and **W. R. Foster** of Mobil Research and Development Corp. First place in the graduate division went to **C. H. Freeman** of NTSU. The second and third place winners were, respectively, **W. B. Mohr** of UT-Arlington and **S. Truitt** of NTSU. In the undergraduate division the first place winner was **J. H. MacKay** of Austin College. The second place winner was **E. P. Seitz** of TCU. The third place award was shared by **G. D. Smith** of UT-Arlington and **Tom Folsom** of NTSU. In the evening a reception and awards dinner was held in the Crystal Room of Marquis Hall. The after dinner speech was given by **Dr. Peter Girardot** of UT-Arlington, while **Larry Smith** gave out cash award and certificates on behalf of Alpha Chi Sigma. It is hoped that this event will be the first of a continuing series of Meetings-in-Miniature.

In the D-FW ACS Section **Dr. E. C. Hurdis** of Texas Woman's University has been elected a fellow in the American Institute of Chemists. **Dr. Norman G. Foster** of TWU has been elected a Fellow of the American Association for the Advancement of Science. At the Socony Mobil Lab **Dr. James C. Melrose** gave seminars at Rice and at UT-Austin. **Dr. Anton G. Ostroff** will be serving as Chair of a new ASTM subcommittee on saline water. **Dr. Earl Snavely** presented a lecture at the National Conference of the National Association of Corrosion Engineers held in Cleveland. **Dr. E. Thomas Strom** presented a talk on "Substituent Effects on the g Values of Aromatic Free Radicals" at the 2nd Conference on Linear Free Energy Relationships held in Irvine, CA. At the Southwest Center for Advanced Studies *(now UT-Dallas)* **Dr. Harold Werbin** attended the ACS meeting in San Francisco and the Federation of American Societies for Experimental Biology and Medicine held in Atlantic City.

At the University of Arkansas **Dr. Lothar Schafer** has joined the chemistry department as an assistant professor. Eminent geochemist **Dr. Takahisa Hanya** will be a visiting professor in the department during the 1968-69 academic year. **Drs. W. L. Meyer** and **R. N. Porter** have been promoted to professor. **Dr. George D. Blyholder** has been appointed vice chairman of the department.

At UT-Austin **Dr. Norman Hackerman**, current president of the university, was session chairman of a Gordon Research Conference on Corrosion in July. **Dr. Alan Cowley** attended the Gordon Research Conference on inorganic chemistry in August. **Dr. Nathan Bauld** attended the Gordon Research Conference on radical ions in July. **Dr. Norman F. Brockmeier** in chemical engineering has received an NSF grant.

contributed by
E. Thomas Strom

And Another Thing...

Start With the Brain

By Denise L. Merkle, PhD

It's a new school year, a new perception of autumn, and, one can only hope, a new attitude. All this New affects every aspect of our lives, but it all starts with the brain. To put it colloquially, if the brain ain't happy, ain't nobody happy. So, it's only fitting to discuss some brain-related topics to kick off this new season of learning. The first is food for thought - and the second is an advancement that also illustrates the drawbacks of our healthcare payment system - Intriguing, no?

Topic/Hypothesis 1: Alzheimer's Disease (AD) is contagious1. As with many scientific discoveries, this concept is terrifying, but, as with most real-world problems, elucidation of the mechanism is the only way to develop efficacious treatments - and cures. Is AD a transmissible disease such as Scrapie, Mad Cow, and Creuzfeld-Jakob? Prions were once the subject of scoffing, but are now accepted as robust, persistent, transmissible, and fascinating vectors of brain disease2. Kuru, the prional disease that kicked off the idea of human brain disease as contagion was fairly easy to alleviate. When bereaved persons stopped eating the brains of their deceased relatives, the transmission of Kuru all but ceased. Perpetuation of souls likely continued without the spread of prion-induced dementia, which reinforces the idea that beliefs are not science - but that's another 'And Another Thing'. Are prions rampant in wastewater, ready to spread self-directed protein misfolding in the masses? Some visionaries say yes. Sooner -rather than later, one hopes- the disease mechanisms will be identified and properly targeted, so prional diseases and whatever else is adversely affecting brains around the world will become historical stories and not current events.

Topic 2: Migraine. Migraine sufferers experience everything from minor vision disturbances and stomach upset to full-on debilitation. Migraine intensity varies wildly from symptoms that can be vanquished by aspirin within an hour of onset to unrelieved agony that can send a victim to bed for a week. Until now. In May 2018, FDA announced approval of a novel injectable that reduces migraine in some patients3. The self-administered calcitonin gene-related peptide (CGRP) antagonist knocks out this migraine-inducer and stops the cascade of biochemistry that, unchecked, results in migraine. This is a breakthrough treatment that will give many migraine sufferers a fraction of their lives back - if they can afford it. Anti-CGRP costs more than $600 per month - over $7000 per year. The annual earnings of an employee who makes the federal minimum wage of $7.25/hour is a little more than $15,000.4 How might one secure a drug that trades half ones' wages for 12-24 functional days? If employees have insurance, will that insurance cover the costs? Will the manufacturer have a compassionate pricing program? Will those who need relief most have access to this medication? The answers to these questions remain a mystery, a headache, even.

So, there you have it. Two brain-related topics to ponder as 2018 advances. As daily life hits its autumn swing, consider: Everything starts with the brain.

From the ACS Press Room

World's oldest cheese found in Egyptian tomb (contaminated with Brucella)

Proteomic Analyses on an Ancient Egyptian Cheese and Biomolecular Evidence of Brucellosis

Analytical Chemistry

Aging usually improves the flavor of cheese, but that's not why some very old cheese discovered in an Egyptian tomb is drawing attention. Instead, it's thought to be the most ancient solid cheese ever found, according to a study published in ACS' journal *Analytical Chemistry.*

The tomb of Ptahmes, mayor of Memphis in Egypt during the 13th century BC, was initially unearthed in 1885. After being lost under drifting sands, it was rediscovered in 2010, and archeologists found broken jars at the site a few years later. One jar contained a solidified whitish mass, as well as canvas fabric that might have covered the jar or been used to preserve its contents. Enrico Greco and colleagues wanted to analyze the whitish substance to determine its identity.

After dissolving the sample, the researchers purified its protein constituents and analyzed them with liquid chromatography and mass spectrometry. The peptides detected by these techniques show the sample was a dairy product made from cow milk and sheep or goat milk. The characteristics of the canvas fabric, which indicate it was suitable for containing a solid rather than a liquid, and the absence of other specific markers, support the conclusion that the dairy product was a solid cheese. Other peptides in the food sample suggest it was contaminated with *Brucella melitensis*, a bacterium that causes brucellosis. This potentially deadly disease spreads from animals to people, typically from eating unpasteurized dairy products. If the team's preliminary analysis is confirmed, the sample would represent the earliest reported biomolecular evidence of the disease.

The research was supported by the Italian Ministry of Education, University and Research, the University of Catania and Cairo University.

From Wikipedia: notes on Brucellosis

Brucellosis in humans is usually associated with consumption of unpasteurized milk and soft cheeses made from the milk of infected animals…and with occupational exposure of laboratory workers, veterinarians, and slaughterhouse workers. Some Brucella vaccines used in livestock can also cause disease in humans if accidentally injected. Brucellosis induces inconstant fevers, miscarriage, sweating, weakness, anaemia, headaches, depression, and muscular and bodily pain….the consequences of Brucella infection are highly variable and may include arthritis, spondylitis, thrombocytopenia, meningitis, uveitis, optic neuritis, endocarditis, and various neurological disorders collectively known as neurobrucellosis.

COUNCILORS NOTES

Mary Anderson

ACS National Meeting, Boston, Fall 2018

Hello all!

All of our DFW Councilors attended (Tom Strom, Linda Schultz, Jason McAfee and Mary Anderson).

The ACS National meeting was very well attended and had ---so many excellent talks (Leroy Hood, Jill Millstone Harry Atwater), posters and the expo!

So much to do and so little time. Yes, everyone complained about the distance from the hotels and the convention center, and the slow bus service.

The ACS Council had a large agenda. President Peter Dorhout's reported on his focus on diversity and inclusivity and also on promotion of safety.

President-Elect Bonnie Carpenter's theme is collaborations, between Industry and Academia, across borders, across ACS and with other professional Societies. She reminds everyone that 2019 is the International Year of the Periodic Table (100 years!).

Some tidbits:

ACS membership is down slightly. The Membership Affairs Committee (MAC), the committee that I serve on, has launched several initiatives to understand the decrease and to reverse the trend. MAC has helped make it easier to renew your membership: one can get a membership discount at meeting, and at the Boston meeting there was a 20% reduction in rates for on-site renewals!!! I hope we can continue this discount at Orlando and San Diego, stay turned for updates. There is also a multi-year renewal (well at least there will be no rate increases with the multi-year).

In the Works: There are plans for multi-year discounts for graduating undergraduate and graduate student members! Joint memberships with the American Association of Chemistry Teachers and other Societies are being explored... Additionally, you may be receiving surveys to understand how ACS can engage you more fully. Please help by responding to the surveys.

Council passed an amendment to the ACS Bylaws to allow affiliation with other Organizations.

After a lively discussion, including acknowledging that the membership and attendees at the National meetings are about 20% international and CAS and Pubs have many international subscriptions, the Council passed an amendment to the ACS Bylaws to allow International Chemical Chapters to charge their members local dues and to remove a restriction so that

they may receive funds from ACS. The formation of a new chapter in Columbia has been approved.

Over the past several years, ACS has assisted Local Sections, including ours to update our Bylaws, so finally, National is doing that themselves and streamlining their Standing Rules.

At our Division IV caucus, we heard that advanced registration for Orlando will be the same, $490. However, it will likely increase for the San Diego Fall meeting.

Both at the Council meeting and in several other ACS groups, there was discussion about what role(s) ACS should play in preventing sexual harassment in the sciences. [The topic was the lead story in the September 18, 2017 issue of C&EN and a symposium was held at the Spring 2018 meeting in New Orleans.]

Our section was nominated for two Chemluminary Awards: our Chair, Kirby Drake had a beautiful poster, but alas this wasn't our year. Linda Schultz suggests that we make a more concerted effort to pursue these.

Don't forget to vote in the upcoming elections for National ACS president and Board of Directors.

Hope to see everyone at an upcoming ACS DFW section meeting!

Mary Anderson

#ACSDFW

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The Pros and Cons of Volunteering

Denise Merkle, PhD

Chair-Elect, DFW Section

Volunteers. The American Chemical Society as we know it could not exist without members who donate their time, energy, and intelligence to supporting chemistry and the professionals who love *our* science. If you've ever received e-vitations to local section events, viewed a demonstration during National Chemistry Week, attended a local section, Regional, or National meeting, won an ACS Award, or read an article in the SW Retort, you've experienced the input of volunteers. In addition to the many ACS employees who are paid to support the ACS Mission, significant contributions to the advancement of chemistry and chemists are due to the dedication of volunteers.

While volunteering isn't for everyone, there are many ways beyond your day job to interact with chemists - or not (no one is going to force nerds to talk to anyone. E-communication is a wonderful thing).

Local Section elections will soon be upon us. In the interests of encouraging members to add their reagents into the flask of volunteerism, Past and Present local section officers and other volunteers for Chemistry were asked to briefly reveal *How They Benefit from Volunteering for Chemistry*. In their own words, here's why donating some time is a good thing:

William F. Carroll, Jr, PhD. Former ACS President & Director: My volunteerism in ACS has virtually totally been on a national level, at least partially because of my travel:

Like most people who volunteer in ACS governance, I was blissfully ignorant of it until someone asked me to be involved. Like most people, I hated to straight up tell a colleague, "No." So I said yes, 19 years ago. I can truthfully say that in those 19 years the best things that happened to me in my professional life happened as a result of being an ACS volunteer. I have made a difference in others' lives and they have made a difference in mine. And I have gotten back orders of magnitude more than I gave. I tell students who come to Career Pathways workshops, "Every opportunity starts out looking like just more work." This is one of those paradoxes, but trust me, the opportunity is there.

Mary E. Anderson, Ph.D., Councilor for DFW; Member of Membership Affairs Committee; Liaison to the Graduate Education Affairs Committee, Prof Texas Woman's University: The best part of participating in ACS governance: I have made lots of contacts and friends and developed leadership skills. I get a chance to make a difference in how people perceive Chemistry.

Tom Strom, PhD, Councilor: I have been very happy to serve the Dallas-Fort Worth ACS Section as, earlier, Section Chair and, more recently, as one of your four councilors. The most gratifying work for

me was serving on the ACS Committee on Economic and Professional Affairs, as that committee's work impacts all ACS members, not just those in one section or division. ACS thrives on the efforts of its many volunteering members.

Trish Smith, PhD, Former Secretary ACSDFW: Elected positions gave me the opportunity to not only participate in governing the dfw section but also to make lasting friendships with other chemists.

Moji Bonakdar, Ph.D.: I have served ACS in several ways: Local ACS chair, Secretary of treasure, Chair awards, science judge and etc. I feel great and get a sense satisfaction of participating in ACS career service program now as an ACS career consultant. I help job seekers with reviewing their resumes and mock interviews.

By giving back to my professional society, l also get Psychological benefits. Volunteering increases my overall life satisfaction and helps me feel good about myself because l am **helping** others. It can also help to decreases stress and ease depression.

Kayla N. Green, PhD, Associate Professor, Department of Chemistry & Biochemistry TCU & National Chemistry Week Coordinator:

What other opportunity would allow you to interact with the future leaders in chemistry? The undergraduate and high school student volunteers are the true stars of our weeklong NCW event and I simply help organize, direct, and polish the rough edges here and there.

Obviously, the ability to positively influence others' careers and success ranks high among those who volunteer for science. Interaction with Science Professionals is also a driving factor behind volunteerism. Many volunteers are, excuse the phrase, roped into service (in Texas, should this be lassoed?), but once in the corral, most find the Pros to outweigh the Cons.

There are, as with everything, Cons. Occasionally the work seems overwhelming. Amazingly enough, not all scientists are enjoyable to work with. Pre-tenure life is often not conducive to volunteer activities, even for ACS. The requirements from ACS National can be, um, unique and oblique, and sometimes, the process just isn't worth the gain. Nothing is All Good or All Bad, however, and as you can see from the statements, above, long-time volunteers continue to dedicate significant portions of their elective lives to Chemistry, because the benefits far outweigh the losses.

There are lots of options out there, if you want to try a volunteer opportunity or two. Ask an ACS member or write to your local section officers for more specific information. **https://dfw.sites.acs.org/officers.htm**

Whether you titrate in or just open the stopcock, you'll (probably) be glad you did.

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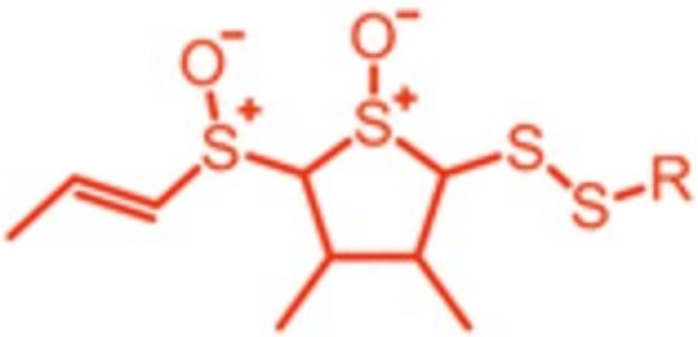
From the ACS Press Room

The origin of off-taste in onions

Allithiolanes – Nine Groups of Newly Discovered Family of Sulfur Compounds Responsible for the Bitter Off-Taste of Processed Onion

Journal of Agricultural and Food Chemistry

Chopping onions is usually associated with watery and stinging eyes. But after the onions are diced and the tears are dried, the vegetable pieces can sometimes develop an unpleasant bitter taste. Now, one group reports in ACS' *Journal of Agricultural and Food Chemistry* that they have identified previously unknown compounds causing this off-taste.



Thanks to onions' characteristic taste and strong smell, they are one of the most popular vegetables around the world. Onions are known for their versatility — people frequently eat them raw or add them to numerous dishes as they cook. But as onions are chopped and processed for cooking, a bitter taste that could affect the taste of the resulting meal can sometimes develop. Very little is known about why this particular phenomenon occurs. Previous research has shown that onions release a compound called lachrymatory factor upon being cut that causes eyes to water and sting. In addition, scientists have also concluded that several sulfur-based compounds are also formed when the onion is chopped, but none of these caused a bitter taste. So Roman Kubec and colleagues wanted to identify the bitter onion compounds.

The team processed onions with a kitchen juicer. Freshly obtained juice was not bitter, but after 30 minutes, it developed a strong bitter taste. The group performed sensory-guided high-performance liquid chromatography to identify the compounds that formed over time in the onion juice. The researchers discovered nine groups of new sulfur compounds in the onion juice, which they dubbed allithiolanes. These compounds form spontaneously when the onion is damaged. The allithiolanes were not limited to onions; further testing showed they were also present in leeks, and one of the groups was found in garlic.

The researchers acknowledge funding from the Grant Agency of the University of South Bohemia, the National Program of Sustainability and the Ministry of Education of the Czech Republic.

From the ACS Press Room

Biodegradable plastic blends offer new options

Biodegradable Plastic Blends Create New Possibilities for End-of-Life Management of Plastics but They Are Not a Panacea for Plastic Pollution

Environmental Science & Technology

Imagine throwing your empty plastic water bottle into a household composting bin that breaks down the plastic and produces biogas to help power your home. Now, researchers have taken an early step toward this futuristic scenario by showing that certain blends of bioplastics can decompose under diverse conditions. They report their results in the ACS journal Environmental Science & Technology.

Plastic waste pollution is a global environmental problem, particularly in oceans, where plastic debris can harm or kill sea animals and birds who ingest or become entangled in it. Despite increased levels of recycling in many countries, most plastic waste still ends up in landfills or the environment. Scientists have developed biodegradable plastics, but they often lack the flexibility, strength or toughness of conventional plastics. Blends of different bioplastics can offer improved characteristics, but their environmental fate is uncertain. Tanja Narancic, Kevin O'Connor, Ramesh Babu Padamati and colleagues wanted to examine the degradation of individual bioplastics and their blends under various conditions. The researchers studied the fates of 15 different plastics or blends under managed conditions, such as composting and anaerobic digestion, as well as unmanaged environments, including soil and fresh or marine water. Polylactic acid (PLA) is one of the best-selling biodegradable plastics on the market, but it requires high temperatures for breakdown and is not home-compostable. Surprisingly, a blend of PLA and polycaprolactone (PCL) degraded completely to carbon dioxide, biomass and water under typical home-composting conditions. Many of the individual plastics and blends that were tested decomposed under conditions of anaerobic digestion, a process that can produce biogas, and all degraded with industrial composting. The researchers say that biodegradable plastic blends could create new possibilities for managing plastic waste. However, only two plastics, polyhydroxybutyrate (PHB) and thermoplastic starch (TPS), broke down completely under all soil and water conditions. Therefore, biodegradable plastics are not a panacea for plastic pollution, and they must be managed carefully after they leave the consumer, the researchers say.

The authors acknowledge funding from the European Commission Horizon 2020 Programme, the European Commission Seventh Framework Programme for Research and the Science Foundation Ireland.

ACS Local Section
Dallas-Fort Worth

September Meeting

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Around-the-Area

UTD

Assistant Professors **Sheel Dodani** and **Gabriele Meloni** have each been awarded five-year Maximizing Investigator Research Awards from the NIH NIGMS.

Associate Professor **Jie Zheng** was awarded a three-year research grant from the Robert A. Welch Foundation.

Associate Professor **Gregg Dieckmann** received the 2018 UT Regents' Outstanding Teaching Award.

Senior Lecturer **Amandeep Sra** received the Iota Sigma Pi Centennial Award for Excellence in Undergraduate Teaching, which is only given to one person in the country/year, and the UT Dallas President's Teaching Excellence Award in Undergraduate Instruction.

Professor **Ray Baughman**, the Robert A. Welch Distinguished Chair in Chemistry and Director of the Alan G. MacDiarmid NanoTech Institute, was elected to the European Academy of Sciences and Arts.

Mai Huynh, a UT Dallas Graduate McDermott Scholar working in the labs of Professor Rocky Draper and Associate Professor Paul Pantano, received a NSF Graduate Research Fellowship.

Graduate student **Katherine Benavides** and undergraduate student **Gino Occhialini** were recipients of the inaugural John P. Ferraris Research Excellent Awards, established to recognize Professor Ferraris' 20+ years of service as the Chemistry Department Chair.

UTA

Associate Professor **Frank Foss** was recognized with the Board of Regents highest honor, the Regents' Outstanding Teaching Award for excellence in the classroom. .

Hamish Small Professor **Purnendu (Sandy) Dasgupta** received the ACS National Award in Chemical Instrumentation on Sept. 22 at the ACS National Meeting held in Boston.

Associate Professor **Brad Pierce** has received a $429,033 NIH grant to study "Pre-Steady State Kinetics and O2/NO Reactivity Among Thiol Dioxygenase Enzymes." Brad presented a poster in July at the Gordon Conference on "Enzymes, Coenzymes, and Metabolic Pathways." His coauthors were **Sinjinee Sardar, Nicholas York, Andrew Weitz,** and **Michael Hendrich**.

Welch Professor **Dan Armstrong** gave four keynote presentations over the summer. They were for Chirality 2018 at Princeton, HPLC 2018 in Washington, D.C., the Gordon Research Conference on Molecular Structure Elucidation in Newry, ME, and the Ozark Biomedical Initiative 2018 Research Symposium in Rolla, MO.

Associate Professor of Instruction **Jimmy Rogers** has written a textbook for second semester general chemistry courses. This book, General Chemistry 2, is now being used at UT-Arlington along with Jimmy's previous textbook, General Chemistry 1.

E. Thomas Strom attended the ACS National Meeting in Boston, where he

participated in a panel discussion based on two books he co-edited for ACS Books, The Posthumous Nobel Prize in Chemistry. Volume 1. Correcting the Errors and Oversights of the Nobel Prize Committee, published in hard copy last month by Oxford University Press and Volume 2, Ladies in Waiting for Nobel Prizes, currently in preparation. The other panelists were his co-editor **Vera Mainz** and three chapter authors from the two books.

U of Arkansas

On the Go

Jie Xiao presented an invited talk, "Reactions or no reaction: lithium deposition on the surface of solid state electrolyte" at the Electrochemical Society Spring meeting in Seattle, May 2018.

Feng Wang gave two invited talks in July. "Developing Accurate and Simple Force Fields with only *ab initio* Information with the Adaptive Force Matching Method" was presented July 17-21, 2018 at the Ion Solutions, Biology, Energy, Environment in Telluride, CO. "Missing Physics in Computational Free Energy Calculations of Ion Hydration and Practical Centroid Molecular Dynamics with Force Matching" was presented at the Manybody Interactions Workshop, Telluride, CO, July 9-12, 2018.

Jingyi Chen presented an invited talk, "Cu-Based Hybrid Nanostructures: From Syntheses to Applications," Noble Metal Nanoparticles Gordon Research Conference, June 17-22, 2018.

Nan Zheng gave a talk "Difunctionalization of Cyclopropylanilines and Cyclobutylanilines" at the 233rd ECS meeting, Seattle, WA on May 17, 2018, and a second talk, "A Photocatalyzed Cascade for the Synthesis of the Tetracyclic Core of Akuammiline Alkaloids" at the 14th SINO-US Chemistry Professors Conference, Wuhan, China on June 21, 2018.

Publications

Bingbin Wu, Shanyu Wang, Joshua Lochala, David Desrochers, Bo Liu, Wenqing Zhang, Jihui Yang, Jie Xiao. The Role of Solid Electrolyte Interphase Layer in Preventing Li Dendrite Growth in Solid-State Batteries. *Energy & Environmental Science, 2018, 11, 1803-1810*. DOI: 10.1039/ C8EE00540K.

Hao Chen, Sumana Venkat, Paige McGuire, Qinglei Gan, Chenguang Fan. Recent Development of Genetic Code Expansion for Posttranslational Modification Studies. *Molecules. 2018; 23(7):1662*.

Foysal Z. Khan, Joshua A. Hutcheson, Courtney J. Hunter, Amy J. Powless, Devin Benson, Ingrid Fritsch, and Timothy J. Muldoon. Redox-Magnetohydrodynamically Controlled Fluid Flow with Poly(3,4-ethylenedioxythiophene) Coupled to an Epitaxial Light Sheet Confocal Microscope for Image Cytometry Applications. *Anal. Chem. 2018, 90(13), 7862-7870.*

Rui Wang, Limei Xu, and Feng Wang. Molecular scale processes affecting growth rates of ice at moderate supercooling. *Frontiers of Physics, 2018, 13, 138116.*

M.H. Beyzavi et al. Synthesis, structural characterization, biological evaluation and molecular docking studies of new platinum (II) complexes bearing isocyanides. *New Journal of Chemistry 2018, 42, 8681-8692.*

From the ACS Press Room

A pill for delivering biomedical micromotors

Micromotor Pills as a Dynamic Oral Delivery Platform

ACS Nano

Using tiny micromotors to diagnose and treat disease in the human body could soon be a reality. But keeping these devices intact as they travel through the body remains a hurdle. Now in a study appearing in ACS *Nano*, scientists report that they have found a way to encapsulate micromotors into pills. The pill's coating protects the devices as they traverse the digestive system prior to releasing their drug cargo.

About the width of a human hair, micromotors are self-propelled microscopic robots designed to perform a host of biomedical tasks. In previous research, Joseph Wang, Liangfang Zhang and colleagues used micromotors coated with an antibiotic to treat ulcers in laboratory mice. They found that this approach produced better results than just taking the drugs by themselves. However, the researchers noted that body fluids, such as gastric acid and intestinal fluids, can compromise the effectiveness of micromotors and trigger early release of their payloads. In addition, when taken orally in fluid, some of the micromotors can get trapped in the esophagus. To overcome these issues, Wang and Zhang sought to develop a way to protect and carry these devices into the stomach without compromising their mobility or effectiveness.

The researchers created a pill composed of a pair of sugars — lactose and maltose — that encapsulated tens of thousands of micromotors made of a magnesium/titanium dioxide core loaded with a fluorescent dye cargo. These sugars were chosen because they are easy to mold into tablet, can disintegrate when needed and are nontoxic. When given to laboratory mice, these pills improved the release and retention of the micromotors in the stomach compared to those encapsulated in silica-based tablets or in a liquid solution. The researchers concluded that encapsulating micromotors in traditional pill form improves their ability to deliver medicines to specific targets without diminishing their mobility or performance.

The authors acknowledge funding from the Defense Threat Reduction Agency Joint Science and Technology Office for Chemical and Biological Defense, the Charles Lee Powell Foundation, the Consejo Nacional de Ciencia y Tecnología (CONACyT) postdoctoral fellowship, Fulbright grants, the Comisión Nacional de Investigacion Cientifica y Tecnologica (CONICYT) and the China Scholarship Council.

From the ACS Press Room

DNA-based method detects trace amounts of peanut in foods

Development and Evaluation of a Real-Time PCR Multiplex Assay for the Detection of Allergenic Peanut Using Chloroplast DNA Markers
Journal of Agricultural and Food Chemistry

For people with severe peanut allergies, eating even miniscule amounts of the legume can trigger anaphylaxis — a life-threatening condition characterized by dizziness, breathing difficulties and, sometimes, loss of consciousness. Now, researchers have developed a sensitive new test to detect trace amounts of peanuts in foods using the peanuts' DNA. They report their results in ACS' *Journal of Agricultural and Food Chemistry.*

Surveys have indicated that at least 3 million people in the U.S. suffer from peanut allergies, with the number rising steadily over the past decade. People with known allergies are usually careful to avoid foods containing peanuts, but small amounts sometimes contaminate foods that don't list peanuts as an ingredient. Scientists have developed several methods to detect peanut allergens in foods; however, most of these test for proteins that can be destroyed during food processing. In contrast, DNA is typically more stable than proteins. Other researchers have detected peanut nuclear DNA in foods with a sensitive technique called polymerase chain reaction (PCR). But there's just one nucleus per cell, whereas plant cells have many chloroplasts, which also have DNA in them. Peanut chloroplast DNA has unique sequences that are not found in other plants. So, Caroline Puente-Lelievre and Anne Eischeid wondered if they could develop an even more sensitive and specific test by targeting DNA from peanut chloroplasts.

The team designed a PCR assay to detect three short DNA sequences found in peanut chloroplasts. By targeting the three regions at once, the researchers had greater confidence that the results were specific for peanut chloroplast DNA. They spiked six different foods, which varied from blueberry muffins to tomato salsa, with small amounts of the legume. The assay detected peanut in all of the foods over a broad range of spiked amounts, with a detection limit of about 1 part per million (ppm), compared with 10 to 50 ppm for previous PCR assays targeting nuclear genes.

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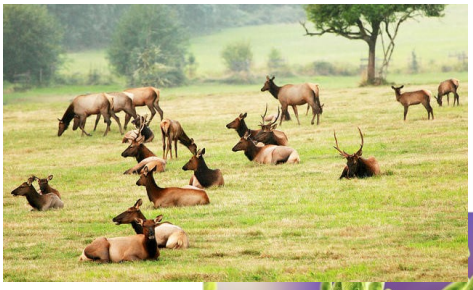
From the editor

Welcome back to the Southwest RETORT, now in its seventy-first year of publication—and its seventh year as an internet publication.

When I first started editing the electronic RETORT, it took a while to get people to send news and articles, and the issues would be pretty slim. So, I began using news shorts from the ACS website to fill in the issues. I try to select news shorts that will be pertinent to readers, but I always get one (or maybe two) that I find intriguing, even if they are not of general interest. This month, it's the article from *Analytical Chemistry* on really old cheese, found in the tomb of Ptahmes, mayor of Memphis in Egypt during the 13th century BC. First discovered in 1885, it was rediscovered in 2010. The whitish solid material found in a broken jar proved to be made from cows' milk and either goat or sheep milk, and appears to be contaminated with a form of *Brucella,* the microorganism that causes brucellosis. Here are some comments on Brucellosis from Wikipedia: *Brucellosis in humans is usually associated with consumption of unpasteurized milk and soft cheeses made from the milk of infected animals…it induces fevers, miscarriage, sweating, weakness, anemia, headaches, depression, and muscular and bodily pain….the consequences of Brucella infection are highly variable and may include arthritis, spondylitis, thrombocytopenia, meningitis, uveitis, optic neuritis, endocarditis, and various neurological disorders collectively known as neurobrucellosis.* Enter Louis Pasteur! Yes, pasteurization has largely done away with Brucellosis in humans in the US, but it is endemic in some third world countries. In the US, the elk in Yellowstone carry the disease, and can spread it to cattle in adjoining areas; Montana Public Radio carries an interesting article about this situation and the conflicts engendered by attempts at controlling the spread:



http://www.mtpr.org/post/elk-are-primary-source-brucellosis-yellowstone-area-report-says

Best regards,
Connie