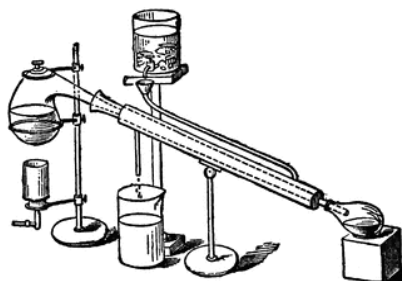




SOUTHWEST RETORT



SIXTY-FIFTH YEAR

NOVEMBER 2012

*Published for the advancement of
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and Chemistry in this area*

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The 1962 winner of the ACS Southwest Regional Award is **Dr. Joe L. Franklin** of Humble Oil & Refining Co. in Baytown, TX. He will receive his award and give his address at the regional meeting in Dallas on Friday, Dec. 7. Dr. Franklin received all his training at the University of Texas, receiving BS and MS degrees in chemical engineering followed by a Ph.D. in physical chemistry in 1934. After receiving his doctorate, he joined Humble, where he became the first person to achieve the position of Research Associate. His fields of interest are thermodynamics, reaction kinetics, and electron impact phenomena.

(Reporter's note: In 1963 he became the first Welch Professor at Rice.)

The ACS November tour speakers are **Dr. Hans B. Jonassen** of Tulane and **Dr. Joe L. Franklin** of Humble Oil Co. Dr. Jonassen's topics are "Metal Pi Complexes," "The Delta Bond in Inorganic Complexes," and "Inorganic Chemistry in Western Europe." Dr. Franklin's topics are "Chemistry of the Rare Gas Ions," and "Ion Molecule Reactions and Mass Spectra at Elevated Pressures."

All the titles of the scheduled papers for the December ACS Southwest Regional Meeting are given in this issue.

At the University of Texas (now UT-Austin) the following individuals received research grants: **R. M. Roberts**, Welch

Foundation, "Chemistry of Alkyl Aromatic Compounds"; **W. C. Gardiner**, NSF, "Construction of an NMR Spectrometer for Student Instruction"; **D. M. Ziegler**, NIH and the American Heart Association, "Medicinal Chemistry"; **L. Hatch**, PRF, "Reactions of Halogens and Dienes"; and **F. N. Jessen**, "Crystal Growth in Adsorbed Films."

The San Antonio ACS Section reports with sadness the death of **Tom Slick** in a plane crash in Montana on Oct. 6. He was the founder of the Southwest Research Center, a developer of Trinity University, a participant in research projects throughout the US, and a world renowned adventurer.

In the Southeastern Texas Section we learn that **Nugent F. Chamberlain** of Humble Oil in Baytown will be an ACS tour speaker in January.

In the Texas A&M-Baylor ACS Section, the speaker at the first section meeting of the academic year was **Dr. Robert J. Speer** of Wadley Research Institute in Dallas. His topic was "Recent Advances in the Biochemistry of Human Blood Coagulation." A&M faculty members **Dr. Bruno J. Zwolinski** and **Dr. Alfred Danti** attended the fall ACS national meeting held in Atlantic City.

CONTRIBUTED BY E. THOMAS STROM

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T104704201

Groundwater Monitoring Wells

By John Spessard



Groundwater is essential to the economic viability and livability of our people. Groundwater is used for drinking water, irrigation, municipal and industrial water supplies and other uses. Groundwater contamination is a serious issue. Groundwater monitoring wells serve to detect any contamination of groundwater supplies and

thus are very important.

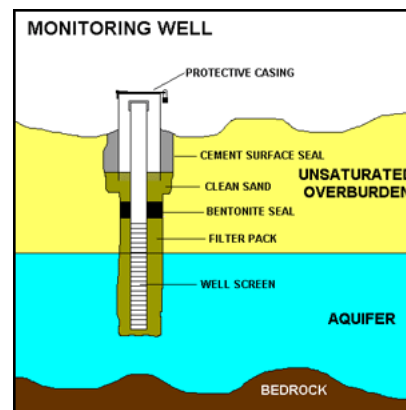


Basically, groundwater monitoring well

systems have at least one well upstream of a potential source of contamination and at least two wells downstream of the potential source. Groundwater monitoring wells also define flow rates, the direction of flow and the depths of the groundwater. Groundwater depths and extent may vary with the seasons and rainfall levels.

Determining the direction of groundwater flow may not be straight forward. As an example, an amusement park roller coaster ride may appear to go both up and down. However, the initial climb is the highest point of the ride and from then on, gravity takes over. In an area that appears essentially flat, determining the direction of flow may not be straight forward.

If the potential source of contamination is, for example, a plant making chlorinated hydrocarbons or a municipal landfill, then the extent of contamination is determined by the differences in the analyses of the downstream wells and the upstream well(s). This requires knowing what potential contaminants to look for.



Before drilling a well, you need to know the depth of groundwater in both dry and wet seasons as well as the direction of groundwater flow. When

building a monitoring well, first a borehole is drilled to a depth significantly below the lowest groundwater level. Then a well casing (pipe) is inserted into the borehole. This casing extends below the lowest expected groundwater level. Typical diameters are six inches for the casing and four inches for the casing. A well screen is inserted into the casing above the highest expected groundwater level. The space between the borehole and the casing is filled with sand to a

level at least one foot above the well screen. All of the well components must be able to withstand the groundwater and any possible contents.

A bentonite clay (non-porous) seal is then added to a thickness of at least one foot above the sand filter. A cement grout fills the space between the bentonite seal and the land surface. Before the grout hardens, a lockable protective casing is inserted at the surface to a minimum height of one foot. This prevents vandalism. The well is pumped to dryness or near dryness and then allowed to recover before being placed in service. The well should be as close to vertical as possible. If the well needs to be abandoned, the casing should be filled with cement or bentonite grout.

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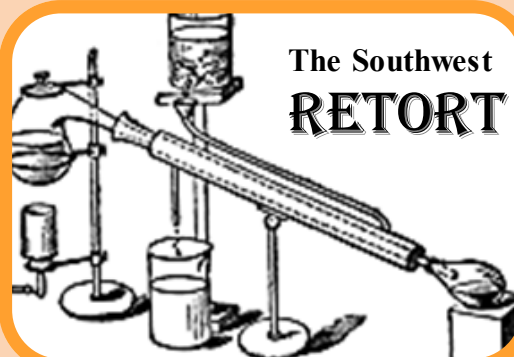
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...AND ANOTHER THING...

By Denise L. Merkle

'And Another Thing', being my signature phrase, pretty much defines the way this column is generated. Topics come to mind. They roll around in my brain, gathering electrons, and another thing and another thing come to mind. Voila! 550 words appear on the page, as if by magic - or at least by chemist. Easy.

For November's Retort, however, nothing was more elusive than a few inconsequential, musing paragraphs. Perhaps the distraction was due to beautiful weather in the Southwest, or really bad weather on the East Coast? Could Columnist's Block be a function of worry over the outcome of a hard-fought and often vicious national election? Halloween candy - is there enough Halloween candy for all the trick-or-treaters? (No, there wasn't). Maybe this was enough to perturb a creative process that is effective, if not necessarily resultant in profundity.

Maybe not. Maybe not at all. The thing is, the real reasons for the conflict between the fear of missing the deadline and the compulsion to say something important, are the very recent deaths of local scientists - scientists who contributed significantly to the world.

In late October a succession of speakers took the podium in UT Arlington's beautiful planetarium to reminisce about - and mourn the loss of - Truman D. Black, PhD., late of the Physics Department at UTA. Truman's offspring, colleagues, fellow

physicists, and former students - all of whom were also his valued friends - related his joy of experimenting, his life in science, and the importance of the input provided by a truly great person, who so recently left us.

Last week, the local chemistry and law communities received with great shock the news that Genie Hansen had passed away unexpectedly. Genie was a wonderful, intelligent, knowledgeable, innovative, competent, supportive person. Her impact on her friends, colleagues, family - likely everyone she met - will not be diminished by the divide now between us, but her presence among us would be so gratefully welcomed.

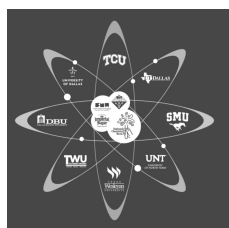
What is the point, you may ask, of writing about not writing? Or of adding in grief that probably has more of a place on the back porch with good friends and a glass of something comforting, than in a scientific newsletter? The point is that the continued effect of those who are no longer physically with us cannot be denied. Those left to cherish memories will incorporate into lives - careers - the knowledge, advice, friendship, humor, passion for learning, and the love of science (possibly also the love of sports teams and alma maters, or liquid nitrogen). What moves onward, to the future, are not stagnant stories to dust off occasionally, but the most cherished qualities of our dear friends, which will be shared, whether we intend it or not, with everyone we impact, as well.

NATIONAL CHEMISTRY WEEK at the MUSEUM a SUCCESS!



The Chemistry Connections -National Chemistry Week 2012 with the Fort Worth Museum of Science and History was once again a huge success. Student affiliates and chemistry organi-

zations from Southern Methodist University, Texas Christian University, Texas Wesleyan University, Texas Woman's University, University of Texas-Dallas, Eastfield College, and University of North Texas all participated in the weeklong event with all universities coming together at the museum on Saturday, October 27. All student



volunteers (130+) donned "Magenta" shirts in honor of this year's nanotechnology theme; C_{60} is magenta in toluene. Yes, we had a 1000L volumetric flask of

C_{60} on hand to show everyone our inspiration!

This was, once again, a student-organized event with Imperial Sugar serving as a major donor for funding. As such, a whole play shop dedicated to the chemistry of sugar was added this year. A related and new addition for visitors to the museum was real-time SEM images of sugar granules (and other nano-materials) thanks to Murry Gans and his group of students from Eastfield College! Student groups provided demonstrations related to Nanotechnology, this year's theme. These included 1-

hour specialty times showing the conductivity of graphene and What is C_{60} ? In the main exploration area, students showed museum guests general chemistry concepts such as carbonation, surfactants, molecular structures, pH and non-Newtonian fluids. We have received nothing but positive feedback to date, and look forward to the final number for visitors to National Chemistry Week at the FWMSH. Several hundred pair of goggles were given away to local DFW students as they visited the museum and to Girl Scouts as they earned their science badges through these activities.

I'd like to personally thank **Cathy Barthelmy** and **Anne Herndon** from the Fort Worth Museum of Science and History for letting us take over the play shops and for being so supportive of this program. A big round of applause goes to this year's DFW NCW chair **Sandi Dang**, a TCU undergraduate. If you are interested or would like to nominate someone to serve as chair for next year's event please contact me anytime (kayla.green@tcu.edu).

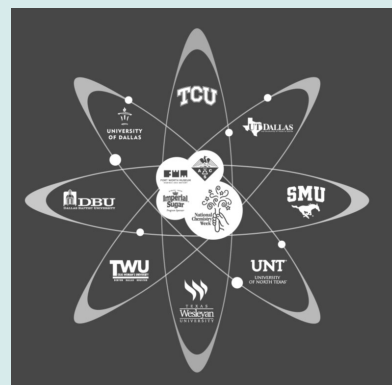
The organization put together a book of our experiments called *Experiment with DFW* to help fund these activities. It is available at the museum book store for \$10, but we'd love to send you a copy as well. Contact chemistryclub@tcu.edu to order! All proceeds will be used for volunteer supplies for all universities in upcoming years.

By Dr. Kayla Green, TCU
Faculty Advisor
TCU Chemistry Club



National Chemistry Week at the Fort Worth Museum of Science and History





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From the ACS Press Room

Buffalo milk mozzarella or buffaloed consumers? New test can provide the answer

A New Method for the Simultaneous Identification of Cow, Sheep, Goat and Water Buffalo in Dairy Products by Analysis of Short Species-Specific mtDNA Targets, Joana Gonçalves, Filipe Pereira, António Amorim, and Barbara van Asch, **J. Agric. Food Chem** 2012, 60 (42), pp. 10480–10485

Those tiny balls of boutique mozzarella cheese with the sticker-shock price tag beckoning from the dairy case — are they the real deal, mozzarella di Bufala



Campana DOP, crafted from the milk of water buffaloes? Or are they really cheap fakes made from cow's milk? A new

method described in ACS' *Journal of Agricultural and Food Chemistry* promises to provide the answer for mozzarella and other dairy products.

Barbara van Asch and colleagues explain that premium dairy products, such as imported specialty cheeses labeled with a designation of origin, are most vulnerable to adulteration. Unscrupulous manufacturers may substitute a less costly

ingredient for an expensive one or skimp on high-quality ingredients. Previous



studies show that the problem is widespread, with bogus dairy products surfacing in Italy, Spain, China, India and other countries. Current methods of detecting fakes can't detect simultaneously cow, goat, sheep

and buffalo milks — the ones most likely to be involved in adulteration — and have other drawbacks. The scientists thus set out to develop a better test.

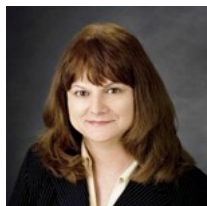
They describe development and successful laboratory testing of such a test on 96 dairy products commercially available in Europe, including cheeses, milks, yogurts and butters. About 12 percent of the products did not contain ingredients listed on the labels. For example, one product label indicated that it was made from 100 percent sheep milk. The test, however, showed that it also contained ingredients from cows and goats.

*The authors acknowledge funding from **Fundação para a Ciência e a Tecnologia (FCT)**.*

Around the Area

DFW Section

IN MEMORIUM: EUGENIA (GENIE) HANSEN



Long time local section member and attorney Eugenia (Genie) Simmons Hansen died unexpectedly Oct. 29. Genie was born Dec. 14, 1955, in Phoenix, AZ, but she moved to Houston when she was in high school. She received BS and MS degrees in biochemistry from Texas A&M in 1977 and 1979, respectively, and a JD degree from the University of Houston in 1984. Her husband was Bill Hansen, a pharmacist, and they moved to the Dallas area when Bill took a position in Grand Prairie. To review and enhance her knowledge of organic chemistry to help out in her law practice, she audited a full year of organic chemistry in night school at UT-Arlington taught by former *Retort* editor Tom Strom. She was an active member of the local section, and she contributed to the sessions on chemistry and the law at the 2004 ACS Regional Meeting held in Fort Worth. For a time, she was also a Sponsor Member of *The Southwest Retort*. Her husband predeceased her in 2002. In 2005 she partnered with Scott Hemingway in the law firm Hemingway and Hansen, where she specialized in intellectual property

law including patents, copyrights, and trademarks. Genie is survived by her children Todd and Kaitlyn Hansen.

[Dallas Morning News Obituary](#)

SWRM 2014: Volunteers Needed!

As many of you know, the Dallas-Fort Worth Local Section will host the 2014 Southwest Regional Meeting (SWRM 2014). Local sections within the Region typically host SWRM every 10 years. SWRM 2004 was quite successful, and we look forward to maintaining the same high standard. in 2014.

Volunteers will form the backbone of success for SWRM 2014. We are in the planning stages for SWRM 2014, and we need volunteers to serve in a variety of capacities. We are looking for volunteers related to PR, funding, exhibits, as well as program chair. If you would like to organize a symposium or event, that would be great. No effort is too small to make a big contribution.

If you would like to be involved in any way in SWRM 2014, please contact me as soon as possible at swrm@acsdw.org. More details about the planning meeting will be circulated via email soon.

Participating in a SWRM is a unique and rewarding experience, and I encourage you all to consider how you can play a part! **Kirby B. Drake, General Chair**

PerkinElmer will be running a day of seminars on analytical applications for food, environmental, and forensic analysis on November 15th at the Hurst Conference Center, 1601 Campus Drive, Hurst, Texas. Seminar is \$50 (free to academics) and **all proceeds are being donated to St. Jude Children's Research Hospital**. For more information or to register, see the webpage at www.perkinelmer.com/INDallas.

East Texas

Section Meeting Monday, November 12, 2012 at East Texas Baptist University, Ornelas Student Center, Marshall TX

Reservations not required: Dinner on your own

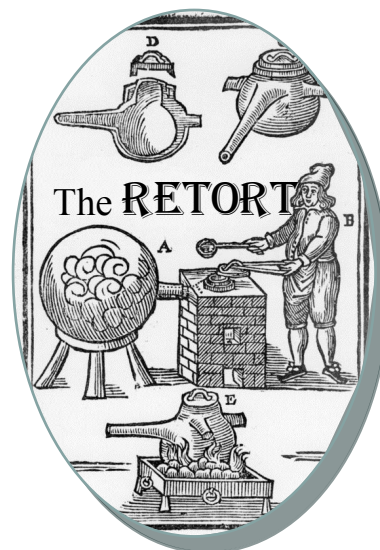
Ruth Ann Armitage



Eastern Michigan University
Archaeological Chemistry of Rock Paintings: Radiocarbon Dating and Chemical Analysis

Rock paintings, or pictographs, are unique cultural remains that are difficult to place into archaeological contexts because they are not a part of the buried stratigraphic record of a site. Direct radiocarbon dating of the paint itself would ideally be used to determine their age. The paint is typically an inorganic

pigment (iron oxides and hydroxides are common) presumably mixed with an organic binder or vehicle to make the paint flow and adhere to the rock surface. Dating rock art by conventional radiocarbon techniques would have required completely destroying the paintings; the advent of accelerator mass spectrometry (AMS) for direct measurement of ^{14}C changed that. A plasma-chemical oxidation method was developed in the 1990s to selectively remove organic carbon from small samples of paintings, yielding CO_2 for radiocarbon analysis by AMS. Some paintings contain easily recognized organic material, such as charcoal, but most do not. At EMU, we are using chromatographic and mass spectrometric methods to determine the nature of the organic material present in rock paintings, and using the plasma-chemical oxidation/AMS method to date them. Results of our work on paintings from locations around the world will be presented.



UTA

The Department of Chemistry at UTA has two new faculty members: Assistant Professors of Chemistry **Dr. Alejandro (Alex) Bugarin** and **Dr. Saiful Chowdhury**.



Alex Bugarin is an organic chemist. He received his BS degree in chemistry, pharmacy, and biology from Universidad Autonoma de Zacatecas, Mexico, in 2003. Then came an

MS in chemistry from UT-El Paso, followed by a Ph.D. from Texas A&M under mentor **Dr. Brian T. Connell**. He did a post-doc at UC-Santa Cruz with **Dr. Javier Read de Alaniz**.

Alex's research interests lie in finding new catalysts for the formation of carbon-nitrogen and carbon-oxygen bonds. He is exploring the use of metal carbenes. He already has a group of four undergraduates working on his projects.



Saiful Chowdhury is a bioanalytical chemist. His research interests involving exploring protein-protein interactions using mass spectrometry. He received an undergraduate degree in applied chemistry and chem-

ical technology from the University of Dhaka in Bangla Desh. He then received an MS degree in organic chemistry from Florida International University. His Ph.D. was obtained at Washington State University with **James Bruce** as mentor. He did a post-doc with **Dick Smith** at the Pacific Northwest Research Laboratory. Before joining the UTA faculty, he was a Research Fellow at the NIEHS laboratory at Research Triangle in North Carolina.

Heart o' Texas

SWRM 2013

The Heart O' Texas section will be hosting the 2013 Southwest Regional ACS meeting. Organizing of symposia will begin soon, under the direction of Dr. Bob Kane of Baylor's Chemistry Dept.

(Bob_Kane@baylor.edu).

From the ACS Press Room

Chewing betel quid exposes half a billion people to direct carcinogens

Direct-Acting DNA Alkylating Agents Present in Aqueous Extracts of Areca Nut and Its Products, Chiung-Wen Hu and Mu-Rong Chao, *Chemical Research in Toxicology*, in publication

Chewing betel quid — the fourth most popular psychoactive substance in the world after tobacco, alcohol and caffeine — exposes its 600 million users to substances that act as direct carcinogens in the mouth, scientists are reporting in a new study. It appears in ACS' journal *Chemical Research in Toxicology*.

Mu-Rong Chao and Chiung-Wen Hu explain that betel quid (BQ) consists of nuts from the areca tree, sometimes combined with spices, such as cardamom or saffron, and other ingredients. Available in commercial forms, BQ is popular among people in China, India and other Asian countries, and people of Asian heritage living in the U.S. and other countries. Scientists have known for decades that chewing BQ can lead to oral cancer,

and showed recently that the substances in BQ could be changed into carcinogens in the body. The authors of this study explored whether there were any substances in the areca nut that can cause cancer directly, without any need for the body to change or “activate” them.

They discovered that compounds in the areca nut can “alkylate” the genetic material DNA, causing changes that increase the risk of cancer, and they are present in betel quid in amounts high enough to do so. “Our study showed that these alkylating agents are present at levels sufficient to cause DNA damage and

could potentially have adverse implications to human health, particularly in the case of the development of oral cancer for BQ chewers,” they say.

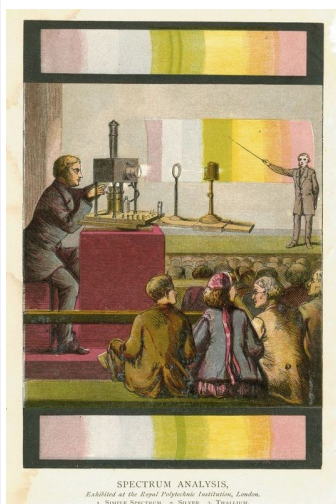


The authors acknowledge funding from the National Science Council, Taiwan.



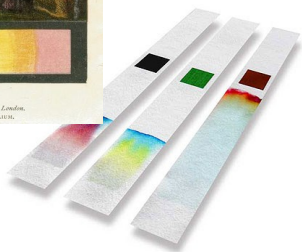
FIVE QUESTIONS FOR...

Featured this month is Dr. **John E. Spessard**, who is a Semi-retired VP in Environmental and Chemical Technology, and a Professional Engineer. Dr. Spessard was voted Chairman-elect of the Mojave Desert Section of the ACS, but transferred out before his term. Dr. Spessard is a regular contributor to the Southwest **RETORT**.



1) How old were you when you realized that you wanted to be a scientist?

I was 15 and in a high school chemistry class. I fell in love with the pretty colors.



2) What aspects of your career in science have been most rewarding?

Answering non-obvious questions by non-obvious methods

3) Is there something you wished that you had studied but didn't? And how did you learn what you needed to know?

I wish that I had taken a course in biochemistry. In the dark ages there were the four major branches of chemistry, organic, inorganic, physical and analytical. I went through a

now obsolete PhD chemistry program where you needed to know something about the four fields. I have found this very useful. I learned enough about chemical engineering through other engineers and study to earn licensure as a Professional Engineer. Being able to function in both fields has been most useful and rewarding.

4) Your contributions to the Retort and e-retort are heavily researched and very thoughtful. What advice do you have for scientists who wish to write?

I was most impressed with Robert Gunning's "Fog Index." It measures how many years of education it takes to understand a text on first reading. A Fog Index of 12



means that a high school education is required to understand it. A lot of long words and a high average number of words per sentence contribute to a high "Fog Index." [Ed.'s note: Nice discussion of this at <http://onyacobber.com/2011/01/stories-through-the-fog/>] I am in the expert witness business and it is a very tough type of teaching. At the university, if the student does not get it, the student flunks. In my business, if a jury or my lawyer do not get it, I flunk!

5) Who is your science hero and why?

Alexander Borodin. He was educated as a physician and turned to chemistry in the Russian scientific backwater. He did postdoctoral work in Heidelberg under Erlenmeyer. He competed with Kekule in the field of self-condensation of small aldehydes. He



is credited with the codiscovery of the Aldol reaction with Wurtz. He was a notable advocate for women's rights and education. In 1872, he was a founder of the School of Medicine for Women in St. Petersburg. [ed.'s note: He lectured

there until his death in 1887; here is a link to an interesting article about women medical students in Russia of that period: [Russian Women Medical Students.](#)]

Composing music was a hobby; his output was small but of the highest quality. He was very respected by his musical peers. His music was adapted for the American musical, Kismet.

LINKS:

from Prince Igor: [Polovtsian Dances](#)
[Borodin biography](#)

Thank you, Dr. Spessard, for your interesting answers to this month's 5 Questions!

To volunteer to be interviewed for the column, please email to retort@acsdfw.org.

UNCLE MOLE

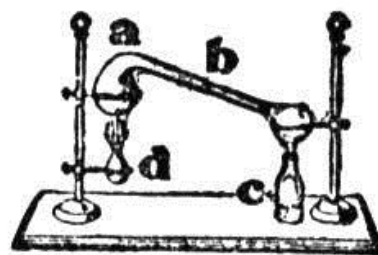
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articles, news
items, and opinion
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Retort.

a, retort; *b*, adapter; *c*, flask;
d, lamp.

From the editor

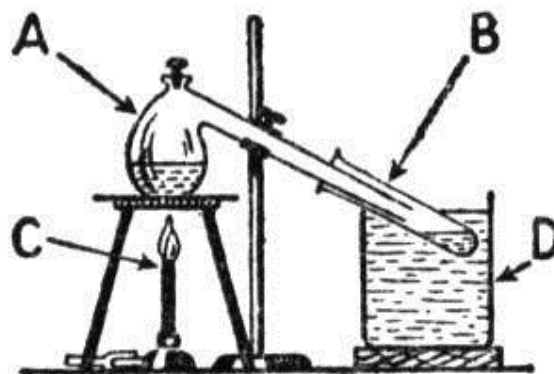
You might notice the proliferation of retorts in the **RETORT** this month. I guess I was carried away by looking at clip art of retorts, mostly in the form of old drawings. There were so many different drawings that I was forced to look up the official definition and read about retorts.

The official definition is “a container or furnace for carrying out a chemical process on a large or industrial scale “. A retort can sit on a benchtop or be a huge industrial process. A cremation furnace is called a retort. An industrial pressure cooker is called a retort. Pot stills (yep, the kind my great-grandfather built) are retorts.

Basically, as chemists know, a retort is a setup of two vessels with a tube leading from one to the other. One vessel, which is heated, holds some material from which we wish to obtain a product. When heated, the gases evolved flow through the tube to the second vessel, which may or may not be cooled in order to condense the gases., i.e., a distillation apparatus.

The words alembic and retort are often used interchangeably; an alembic is a still, used by alchemists, consisting of two vessels connected by a tube. The alembic is actually the lid with the tube attachment, placed on top of the flask the material to be distilled, but the word is often used to refer to the entire apparatus. The invention of the alembic is attributed to Jābir ibn Hayyān, a Persian alchemist (721-815 A.D.), sometimes known as Geber. His notes were written in a code only available to his students...the word gibberish is thought to be derived from his name.

Best regards,



A, retort; B, receiver;
C, flame to heat retort;
D, water to keep receiver cool.

