



NEWSLETTER---

## THE CHEMICAL CONSULTANT

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### TECHNOLOGY -- MORE THAN INFORMATION TECHNOLOGY

To listen to the media and business commentators today when they get excited about "technology" stocks and "technology" companies, one would think that the word has lost its classical and well-established meanings. The meaning most often implicit in this contemporary use of the word "technology" is Information Technology. It is irritating to find that all the technologies that have brought to us our modern essentials and conveniences and are the indispensable backbone of major established industries and global corporations (and our members' skills) are not given decent acknowledgment under that abbreviated term.

Let us carry out a time-honored practice of essay writing and look at a dictionary -- the American Heritage Dictionary of the English Language. In it the word "technology" comes from the Greek "tekhnologia, systematic treatment of an art or craft". It says it can mean the following things: "The application of science, especially to industrial or commercial objectives"; and, "The scientific method and material used to achieve a commercial or industrial objective". That's us, folks!

Admittedly, Information Technology fits within that definition, especially if we consider the scientific roots of so much of it. But it's not all bits and bytes and web pages. Think of the rheology of inks and high-speed printing and the invention of the electric typewriter and its descendent, the keyboard-driven computer. Then there is the application of electricity to telegraphy, then telephone, the facsimile transmission of images, and of formulation of toners for FAX and xerography. Would we have cable news television channels delivering entertainment and enlightenment along with advertising information about products and services if the scientists and engineers of AT&T hadn't focused on electric impulses traveling down first shielded metal wires and then on photons channeled within thin strands of glass, carefully coated with reflection-controlling compositions?

Subscribers to Scientific American magazine have received a supplement to the monthly issues that reprints 15 of the magazine's articles published in the years 1951 to 1990. They are all "history of technology" articles under the title: "The Origins of Technology". The articles take up wheeled transport before 2,000 BC, a Roman water-wheel grain mill, pottery glazes from as far back as 3,500 BC, iron smelting in central Africa in the 7th century BC, and even what may have been an ancient Greek mechanical computer from the first century BC that probably was used in astronomical calculations.

We have to distinguish between Science and Technology, and the try to clear the confusion of the pundits and scribblers working in the popular media conduits over the fact that they are linked but

different. We have to care about who is a scientist and who is an engineer and "who put man on the moon". Maybe it is too much to hope that the dumbing down of language at the hands of the popular media will level off soon, before we all drown in a sea of "buzz-word babble".

## **SWEET CHEMISTRY WITHOUT SUGAR**

We who try to keep the fat, sugar and calories low love this chemistry: a pudding dessert in two minutes from cold skim milk and a purchased powder. What's in it? Modified food starch, maltodextrin from corn, tetrasodium pyrophosphate and disodium phosphate, artificial flavor, salt, calcium sulfate, xanthan gum, mono- and diglycerides, aspartame and acesulfame, potassium sweeteners, natural and artificial color.

Why do we spell it phosphate still when sulphate is obsolete?

Hint: the box is a deep blue color and the big red letters are (something)-O.

## **ALKYLPHOSPHONATES AND GLOBAL POLITICS**

It is not often that the fine art of analytical chemistry is the subject of competing assertions in international affairs. A prominent event in August, 1998 was the destruction by cruise missiles launched by the United States military of a pharmaceutical plant in Khartoum, Sudan based on assertions that it was being used to manufacture a chemical precursor of the nerve gas VX. The chemical precursor goes by the designation EMPTA.

Trying to show that the assumption was false, the plant's owner had samples at the destroyed plant taken and analyzed in laboratories in Europe. The chemistry comes into the picture through rival interpretations of analyses of the samples taken at that site and samples taken at another site; in that case in northern Iraq where a different nerve gas of similar structure, Sarin, was believed to have been used some time previously. It was assumed that, in both cases, the original chemical warfare agent would have degraded through hydrolysis in the open to yield similar but not identical stable products. The EMPTA breaks down to EMPA. The Sarin breaks down to IPMPA.

A February 22 article in Chemical and Engineering News reviewed the disputed facts. The issue hinges on the hydrolysis rate of the two different but closely similar compounds. The illustration shows the two that were compared. Sarin hydrolyzes to IPMPA, which differs from EMPA only in one respect: EMPA has an ethyl group where IPMPA has an isopropyl group. (Does that isopropyl group in the illustration look right to you?)

The reporter, Maureen Rouhi, goes into the "facts" and interpretations and the appropriate niceties of such forensic work. She quoted the Boston University professor who designed the protocol for the study which was undertaken at the request of the owner of the pharmaceutical plant. The niceties include the taking of the samples, the identifying of the specimens, their transport to three laboratories, the limits of detection of the tests, the calibration of the equipment and the accompanying analysis of 25 similar compounds.

It is not the purpose of this article to report the outcome of the tests or the controversy that still persists, but only to present another interesting case where modern analytical chemistry is called on to try to settle a dispute. This time the difference of opinion rises above the level of a court squabble

over damages or patents to reach diplomatic and military heights.

### **INTERNET SITES OF INTEREST**

Last issue, we commented under the title DATA IN THE RAW on the topic of misinformation on the Internet. Here are two sources of help on developing new fact-finding skills as opposed to rumor- or opinion-finding skills.

### **JUDGING QUALITY ON THE WEB**

Librarians at UCLA libraries offer their advice as a public service:  
<http://www.library.ucla.edu/libraries/college/instruct/hoax/evlinfo.htm>

### **VIRTUAL CHASE**

The American Association of Law Libraries has help for Internet searchers at this site under the name of The Virtual Chase (TM, of course) <http://www.virtualchase.com/index.shtml>

### **INTERPHEX TRADE SHOW**

Dick Cowell (member # 720) suggests that you may want to go to April 20-22 INTERPHEX Conference, "The World's Leading Forum for the Pharmaceutical Industry", in their own words. This is the twentieth year of this event.

Concurrent with the trade exhibits there will be 45 one-hour seminars on subjects from Raw Materials to Waste Management and 30 three-hour workshops on such subjects as: HPLC methods; automation, accuracy and integrity in laboratory analysis; and FDA modernization.

Ask Dan Kruh (member # 830) for tips on converting our attendance at such shows into consulting jobs. He recently recounted his experience at a dental-products trade exhibit.

### **SPEAKERS' CORNER JANUARY 1999**

The speaker on January 26 was David Daniels of East Bay Website Company in Oakland, California. His very interesting talk was titled: "Making Your Own Website". His intent was to show that, with a professional Web presence, a sole proprietorship can look like a large corporation, creating a distinctive identity.

Daniels' diverse experience with information technology and degrees from the MIT qualified him to speak with authority to his audience about some of the inside secrets of website creation. At the same time, he was interesting them to take advantage of his offer to prepare custom websites for members, at a discount.

## **SPEAKERS' CORNER FEBRUARY 1999**

Jon Barb, a BS Chemical Engineer with over twenty-three years experience conducting sales training programs for companies such as Xerox Corporation, Union Carbide Corporation and Olin Corporation gave a high-energy talk to communicate his list of essential selling skills for probing, supporting and involving a client using what he calls style matching techniques. These included how to ask questions to gather information and uncover needs, listen effectively, handle objections and increase the likelihood of a totally satisfied client.

Mr. Barb interacted very effectively one-on-one with various members of the audience and provided a stimulating and informative evening. He left the group with the instruction to pay close attention to "What Worked and What Didn't Work" in human relations with clients and learn from the experience.

## **WAR STORY: HOW A REPUTATION WAS BORN**

Daniel Kruh (Member # 830) tells of how he started his career as a polymer chemist. "After I had completed my education as an organic chemist and wrote a thesis on heterocyclic compounds, I worked for a company on polyimides in the field of electrical insulation. I was thrown into the fray by being assigned to find a solution to a problem that had defeated the attempts of others to remove a block to forward progress of the project. The problem was that a laboratory route to a desired polyimide from a prepolymer stage always resulted in a "snotty" gel.

"Perhaps because I had not been trained as a polymer chemist, I proposed a solution that everyone in the lab knew could not work. (They had not tried it). When I directed the technician to put the useless gel in a 110 degree oven, he balked and told me of the dire consequences if he followed my instructions. I convinced him to go ahead.

"To my relief and their surprise the hot polymer was still fluid after 2 hours and remained so on cooling. Subsequent patient research resulted in understanding that the prepolymer conversion at low temperature allowed cross-linking to create the gel. The heating step provided the conditions for the crosslinks to be disrupted and the true polyimide to form.

"After others learned of my clever success I became something of a sensation. This experience taught me that first impressions can make future success easier to come by. I then took evening courses in polymers and rightfully added 'polymer chemistry' to my credentials."

## **FROM THE EDITOR, Dr. Peter M. Hay**

Abraham Lincoln's was granted U.S. Patent No. 6,469 on May 22, 1849. His invention provided a mechanism for floating a steamboat or other vessel higher in the water to enable it to pass over bars, or through shallow water.

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