flashpoint

FUELS & PETROCHEMICALS DIVISION

Fuels and Petrochemicals Division

VOL. 20, NO. 3
FALL 2008

AIChE$_{100}$ .....36526 DAYS.....5200 WEEKS.....1200 MONTHS.....

2008 ANNUAL MEETING

PHILADELPHIA CONVENTION CENTER

PHILADELPHIA, PA

This year, in celebration of AIChE's centennial, the AIChE Annual Meeting will feature special sessions that highlight chemical engineering innovations over the past 100 years, as well as a look into the future. It will also include 15 Core Programming Areas and 17 Topical Conferences focused on the latest developments in areas ranging from core chemical engineering fundamentals to emerging technologies in energy, sustainability, pharmaceuticals, bioengineering and nanotechnology. Over 5,000 attendees are expected to attend over 750 sessions scheduled for this year's event.

Featured Events Include:

- Presentation of the 60th AIChE Institute Lecture, *"The Rise and Realization of the 'Molecular' Chemical Engineering"* by **Mark Davis**, Professor of Chemical Engineering, California Institute of Technology
- Danckwerts Lecture, *"Incremental Identification of Reaction and Transport Models"* by **Wolfgang Marquardt**, Professor of Process Systems Engineering, RWTH Aachen University, Aachen, Germany.
- Professional Progress Award Lecture *"Synthetic Biology in Pursuit of Low-Cost, Effective, Anti-Malarial Drugs"* by **Jay Keasling**, Brad Howe Distinguished Professor of Biochemical Engineering, University of California, Berkeley
- AIChE Centennial Convocation with Keynote Speaker, **Dr. Robert A. Brown**, President, Boston University
- IACChE's Jim Oldshue Lecture, *"Mixing in Chemical Engineering"* by **Carlos A. Cabrera**, President & CEO, UOP
- AIChE's first Industrial Innovation Award, to be presented to 3M, Lecture by **Dr. Frederick J. Palensky**, Executive Vice President and CTO, Research and Development, 3M.

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UPCOMING MEETINGS

2009 Spring National Meeting
Tampa Convention Center • Tampa Florida
April 26-30, 2008

2009 Annual Meeting
Gaylord Opryland Hotel • Nashville, Tennessee
November 8-13, 2009

2010 Spring National Meeting
Grand Hyatt • San Antonio, Texas
March 21-25, 2010

THE BEGINNING

The American Institute of Chemical Engineers (AIChE) was established by a committee of chemists and engineers in 1908 during a period of industrial renaissance in the United States. At the turn of the last century the major world powers were anticipating the great need for engineering expertise both at home and throughout their empires; to be competitive in the world markets required major attention to engineering and technology

The founding of AIChE in 1908 was important not only for the professionalization of chemical engineering, but also because it represented the beginning of the American technological dominance in the world stage of the 20th century. On June 12, 1908 AIChE celebrated its centennial in Philadelphia, the site of the original meeting 100 years ago.

Key principals in the early years were: **Richard K. Meade, John C. Olsen, William M. Booth, Charles F. McKenna, William H. Walker and Arthur D. Little.** This group has been frequently referred to as "The Committee of Six."

Source: **Chemical Heritage Magazine, Fall 2008, pp 26-29.**

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Please direct updates to Editor. Revised10/08

CHAIR'S CORNER

The Fuels and Petrochemicals Division Leadership has been very active in recent months planning activities for the membership.

Some of the recent developments are:

- At the Fall Annual Meeting, the division is sponsoring a session titled "100 years of Fuels and Petrochemicals", commemorating the 100 year AIChE anniversary. The session is on Tuesday afternoon, and includes a coffee break, sponsored by the division, and a post-session reception, sponsored by Praxair. There are several distinguished speakers lined up, and this should be a very entertaining and informative session.
- The Executive Committee agreed to offer Flashpoint distribution electronically after the Centennial Fall 2008 issue, to all members that agree to electronic distribution. Hardcopies will still be printed and mailed to members that request a hard copy. This distribution plan will save the division a lot of annual expenses for printing and mailing, freeing up this money for other division uses.
- The division agreed to sponsor a one-time scholarship annually for a high school student interested in pursuing an engineering degree.
- Arrangements have been made for Alan Boeckmann, the CEO of Fluor Corporation to be the Keynote Speaker for the 2009 Spring National Meeting.
- The division is sponsoring a workshop as part of the AIChE Student Conference before the annual meeting, titled "Interviewing in the Energy Sector". The session will help graduates interested in careers in the Energy Industry.
- Discussion on putting together a Mentorship program for interested Fuels and Petrochemicals Division members.
- Discussion on further Development of the "Members Only" area of the division website – to include relevant Papers and Presentations, information about job opportunities, and links to interesting relevant websites.
- It was agreed to run the next division election electronically. This will also save the division the costs of printing and mailing ballots.

And what list of division activities would be complete without mentioning all of the effort going into preparing Technical Sessions for the Spring 2009 National Meeting, in Tampa, Florida? The call for papers for all sessions is now available through the AIChE website at **http://aiche.confex.com/aiche/s09/cfp.cgi.**

These are some of the ideas and items that the Executive Committee and Programming Committee are actively working on.

If you have an idea that you think would be a good fit for the Fuels and Petrochemicals Division, let us know! You can contact me via e-mail, or come to our Executive Committee Meeting on Sunday morning before the Annual Meeting in Philadelphia, or the 2009 National Meeting in Tampa, Florida.

James Turner

PRESIDENT'S MESSAGE

Addressing Today's Challenges

The primary driver in the formation of the AIChE was to secure greater recognition for the chemical engineer as the result of the concern over the role and status of chemists within the chemical industry[1]. It is also of interest to understand the larger problems being addressed during this time.

William H. Walker[2] discussed unsolved problems in technical chemistry in an address before the International Congress of Arts and Sciences in St. Louis in 1905. He identified three problems:

- manufacture of fertilizers (potash salts were imported and nitrogen and ammonia were produced from coal),
- preservation and conservation of forests (consumption of forest products was increasing out of proportion to the growth of new timber; there was need for the substitution of other raw materials in chemical industries that used wood), and
- hygienic preservation of food.

While today's specific issues are different, the characteristics of the challenges are similar. Domestic conventional resource depletion, oil and gas imports, wealth transfer, energy security, food – are 'problems' being addressed today. U.S. energy resources have changed during the past 100 years from coal and biofuels (primarily wood) to coal, petroleum, natural gas, nuclear, and renewables (primarily hydro). The transition was driven by the availability of convenient, low-cost, domestic petroleum and natural gas. Technology will be an important driver to achieve clean, efficient and sustainable energy systems for our energy future. Our capability to take a systems perspective beyond traditional boundaries and for transforming science into new processes and products will be an integral part of determining our energy future. The next 100 years will be shaped by new technology; what we know is it will be different from today. F&PD will be an important part of how we respond to the challenge of resource productivity – fuel, raw materials, water. The Division's leadership in transitioning to the utilization of innovative approaches to reaching out to students, to using web-based technology for life long learning, and partnering with other organizations illustrates important Division responses to our strategic goals. Thanks for all your work.

Dale L. Keairns

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[1]Presentation by Charles McKenna, "The Justification of the American Institute of Chemical Engineers", June 1908 organization meeting

[2] Walker was one of six appointed to the organizing committee at a meeting held June 1907 that led to the formation of the AIChE. An interesting story for future consideration is to note neither that Walker, nor A. D. Little, who were also part of the committee, were founding members.

COMMUNICATIONS AND COLLABORATIONS

While e-mail is truly wonderful, and its offshoots, such as cell-phone texting, gives us an immediacy undreamed of by earlier generations. It is only the beginning of powerful collaboration tools.

The Web has given us the ability to create hubs and bulletin boards that cannot only be accessed from anywhere there is an internet connection, but can keep track of who saw what and when. This quality alone, if properly applied, could greatly reduce the litigation activities attendant upon us engineers and projects of any size.

Let us consider the simplest forms of communication now used so widely in the world of engineering: **blogs, wikis,** and **portals**. A blog is a trimming of the terms "weblog"... nothing more than a diary, usually date-and-time-stamped. It is an incredibly powerful way to share information. You can create a blog for free at **www.blogger.com** or at **www.wordpress.com**, as well as other places. You can, in fact, create a blog for every project you're working on, and one for your family. And you can restrict who can access them and comment on them--all without knowing anything about web programming.

Those who are permitted to do so can come to a blog and add entries or comments. The blog can be a contemporaneous record of events and communications.

Many engineers and their employers are reluctant to use blogs because of the fear of putting down in writing things that could possible be used against them in subsequent litigation. That is well-founded. Blogs should be used prudently. For example, see this blog:**http://newjmslibrary.blogspot.com**. it reports on the progress of the construction of a Rhode Island library.

A **wiki** is a website that can be edited and commented upon by anyone who can access the site. Modern wikis, such as **www.pbwiki.com** have free versions, such as well as premium versions that allow for more memory, more bandwidth, and so on.

The most famous wiki is **www.wikipedia.com** which can be accessed and quite useful in sharing information, and comes in handy at the start of a research effort.

Portals are web pages created by a firm or company for providing access to a wide variety of information, to different audiences. An **intranet** is a kind of portal for sharing information within an organization, or project. An **extranet** is similar, but has additional security features that limit access to information by people outside the confines of the firm or company.

Source: **Consulting-Specifying Engineer, August 2008.**

A LOOK AT U.S. ENGINEERING

With the rest of the world rising in economic stature and assuming many of the commodity manufacturing roles formerly performed in the U.S., some are quite nervous that manufacturing in America will disappear. Though the role of the U.S. manufacturing industries will continue to change, it will still play a vitally important role in the global production economy because of our engineering strengths.

This may seem unlikely due to the regularly reported downturn in the numbers of engineers and scientists being produced in U.S. colleges. The most off-cited evidence of this is the National Academy of Sciences 2004 report claiming that China produces 600,000 engineers each year and India 350,000, while the U.S. turns out just 70,000. However these facts do not add up always upon closer inspection.

As **Farced Zakaria** notes in his book, "*The Post-American World*, a report from "*The Wall Street Journal* (conducted with the help of academics), shows that most of the engineers graduating in Asia are doing so with two and three-year degrees. Basically they are getting diplomas qualifying them to perform simple mechanical tasks.

The National Science Foundation currently estimates Chinese engineering graduates at around 200,000 a year, while other studies estimate that India produces somewhere in the neighborhood of 120,000-130,000 engineers each year. This, Zakaria says, means that the U.S. trains more engineers per capita than either China or India.

A great example of the divergence in the number of advanced scientific degrees produced between the U.S. and Asia is evidenced in a statistic offered by Zakaria: "In India, universities graduate between 35 and 50 Ph.D.s in computer science each year; in America, the figure is 1,000."

Looking beyond the pure tallies of engineering graduates in the U.S., China, and India, one must also consider the quality of the engineering graduates produced. Despite rigorous testing done abroad to select the best students, Zakaria notes that the number of quality students who leave China and India each year to study in the West is the best evidence of the recognized quality of engineering in the West.

None of this means we can rest easy and forever maintain our preferred status on the high end of the global manufacturing curve. It does mean that we should recognize our status--and not bemoan the fact that other countries are catching on--while continually working to improve it by keeping our engineering academics and innovation matters of top priority.

Source: **Control Engineering, August 2008.**

HOUSING HONCHO

In May 2008 Zuckerman's Boston Properties shelled out $2.8 billion (including debt) for the GM Building on Fifth Avenue, New York City. This is the most money every spent on a single building. The deal included three additional properties for a total of $4 billion.

"It is the best single property purchase I've ever made." boasts Zuckerman since "I've been in the business, which has been since the 1960s." The 50-story, 2 million square-foot GM building defines a trophy property: It sits on Central Park's southeast corner, and its tennants include a chic Apple computer store, cosmetics giant Estee' Lauder, Icahn Enterprises, Jana Partners, and the law firm Weil, Gotshal & Manges.

Source: **Forbes, October 6, 2008**

ON THE BACK OF THE ENVELOPE

An important skill of great use in science is the ability to derive an approximate result from insufficient data. That ability allows one to determine whether or not an answer is reasonable by a quick calculation.

The physicist, **Enrico Fermi** (1901-1954) was a master of the art, and he used to practice his skills by working out "impossible" problems such as "How many piano tuners are here in Chicago?" or "How many alien civilizations are there in our Galaxy?"

Questions of this type are now known as Fermi problems, as they are frequently used in job interviews to test applicants' ability to think on their feet and to make inspired guesses from very little data. What matters there is not the accuracy of the answer but the way of reasoning.

Guestimation is a new book out containing a collection of 73 Fermi problems that physicist **Lawrence Weinstein** and mathematician **John A. Adams** (professors at Old Dominion University, Virginia) gathered from everyday life and various fields of science. Even the science questions require little more than common sense to be answered Fermi style. Take, for example, the question of how many years life the average smoker loses. Well, smoking kills primarily through lung cancer and heart disease whose victims typically die after reaching the age of 50. On average, smoking cannot cost more than 30 years because life expectancy is less than 80. It will cost more than one year as otherwise it wouldn't be a major health issue, so the number of lost years is between 1 and 30. Here we apply one of the few rules of guesstimation: if you have reasonable upper and lower bounds, take the geometric mean of the bound, i.e., the square root of the product of the bounds. In this case, we take the square root of 30, which is a little more than 5. On average, smokers die 5 years earlier than nonsmokers. The guess is close to the actual number of 6.5 years. It also tells us that the main factor that determines the number of 6.5 years. It also tells us that the main factor that determines the number of lost years is not the nicotine but the fact that smoking generally starts killing at age 50.

The rule of taking the geometric mean of the bounds instead of their average reflects the fact that guessed bounds are usually orders of magnitude apart, so taking the average would give too much weight to the upper bound.

Source: **Science, 29 Aug., 2008, p. 1160: Guesstimation by L. Weinstein and J. Adams, Princeton Univ. Press, 2008**

AMERICA'S MOST POLLUTED CITIES

According to the American Lung Association, Los Angeles again tops the list of most polluted cities in America. The association noted the Los Angeles-Long Beach-Riverside metropolitan area reported the worst air quality based on reports from 2003 through 2005. Included in the top 10 list from second to 10th were Pittsburgh, Bakersfield Calif., Birmingham, Ala., Detroit, Cleveland, Visalia, Calif., Cincinnati, Indianapolis and St. louis.

The reports also demonstrated that the number of days listed as the worst ozone levels were fewer than previous years, showing some air quality improvement."

"Nobody is surprised that L.A. has an air pollution problem," said Janice Nolen, the association's assistant vice president for national policy and advocacy. "The problems there are one of the reasons we have the Clean Air Act. But it is important to know that there has been some improvement."

The study also concluded that almost one-half of the people in the U.S. live in counties that still are considered to have unhealthy levels of ozone or particle pollution.

Source: **Pollution Engineering, June 2007.**

CALL FOR NOMINATIONS FOR 2009 F&PD ELECTION & DIVISION AWARDS

Nominations for the following Executive Committee and Division Awards:

2nd Vice-Chair *(Succeeds 1st Vice Chair)*

_____

Secretary *(two year term)*

_____

Directors *(3 year term) (3 to be elected)*

_____

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Nominations for the Division Award and Division Service Award

_____

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American Institute of
Chemical Engineers

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