ACS of Western New York

# Double Bond

*The Newsletter of the Western New York Section of the American Chemical Society*

***Volume 81*** ***April 2009***

## 2009 OUTSTANDING HIGH SCHOOL SCIENCE TEACHER OF THE YEAR

Please join us in recognizing
**Dr. Gail Zichitella**
of Cheektowaga Central High School
at our annual Education Awards Banquet

Thursday April 30, 2009

Cash bar 6:30 p.m.
Buffet Dinner 7:00 p.m.

The speaker this year will be

**Martin Casstevens**

Business Formation and Commercialization Manager
UB Office of Science, Technology Transfer and
Economic Outreach.

**Fairdale Banquet Center**
672 Wherle Dr.

Cost $30, $15 for students

**** RSVP by April 20, 2009 ****

*See page 2 for reservation instructions*

## SECOND ANNUAL UNDERGRADUATE RESEARCH SYMPOSIUM

The Canisius College Department of Chemistry and Biochemistry played host on April 4, 2009 to the Western New York Section's second research symposium for undergraduate students. The event was co-sponsored by the Canisius College Student Affiliates of the American Chemical Society, whose members, in addition to presenting 6 research posters, also organized and staffed registration and food during the all-day event.

In addition to Canisius, students and faculty mentors attended the symposium from the University at Buffalo, Niagara University, Syracuse University, Brock University and McMaster University. Attendees also came from Houghton College and St. Bonaventure University. It was especially encouraging to see people from well-known chemistry programs as well as young faculty from smaller schools. This event and others like it are specifically aimed at increasing research efforts among students at all levels, and at bringing faculty and students from different institutions into closer contact and even collaboration.

The keynote address by Dr. Nicola Brasch of Kent State University was the highlight of the symposium. Dr. Brasch seamlessly introduced her own research on vitamin $B_{12}$ chemistry and at the same time focused attendees on the way she asks questions about scientific problems. The talk was colorful and accessible by audience members of all backgrounds. The timely relevance of trying to understand the role of $B_{12}$ in normal metabolism as well as in aging and other disease states was fascinating for the audience.

The event this year also saw sponsorship from Pearson Education and Honeywell Specialty Materials. If you missed the symposium, you missed a fun meeting highlighting the great work our students are doing. Plan to participate next year's WNYACS Undergraduate Research Symposium, which is tentatively planned for Niagara University.

## 2009 OUTSTANDING HIGH SCHOOL SCIENCE TEACHER OF THE YEAR (OSTY)

Dr. Gail Zichitella of Cheektowaga Central High School is the 2009 OSTY award winner. The award is presented annually by the Western New York section of the American Chemical Society to an outstanding high school science teacher after soliciting nominations from the 95 area high schools.

Dr Zichitella has been teaching at her current location since 1986. Previously she taught at Depew Union Free School, Bishop Newman HS and in the Buffalo school district. In addition to teaching chemistry, Gail has also taught Biology, Earth Science and 7th grade Life Science. In 1996 she confounded and is the co-facilitator of Chemshare; a group of local high school chemistry teachers that assemble monthly during the school year. Each month a different topic is examined and participants share ides, labs and demos that enhance and energize chemistry instruction.

Her unquenchable thirst for education has propelled Gail through a BS in Biology (Chemistry minor, SUNY, Brockport), an MS in Natural Science (UB), and in 2002 a Ph.D. in Science Education (UB). Since 2002 she has worked with the NYS Dep. of Education to develop standards for the NYS Regents Exam in Chemistry. In addition she is the WNY section leader for Building a Presence in Science, funded by the NSTA and Exxon Mobil, where her responsibilities included identifying and training 17 key leaders in WNY. Dr. Zichitella has presented ten papers at regional and national conferences both in the US and Canada and has one publication and another in preparation.

Allow me to quote from a few of the many nomination letters we received. "One of Gail's strengths centers on bringing out the best in her students. Her enthusiasm for learning and high standards has played a role in increasing the rigor in the Cheektowaga Central science department." And from one of the nominating, former students: "What I admire most about Dr. Zichitella is her ability to inject some life into what some people call a dry and boring branch of science. In the chemistry courses that I am taking in college now, none of my professors have reached the same level."

Please join us in recognizing an exceptional educator and leader at our annual banquet where we will also honor our local high school Chemistry Olympiad participants and college students nominated by their departments.

Our speaker this year will be Martin Casstevens, Business Formation and Commercialization Manager at the UB Office of Science, Technology Transfer and Economic Outreach. His diverse background will offer refreshing insights to today's students.

## EDUCATION AWARDS BANQUET

Thursday April 30, 2009

Cash bar 6:30 p.m.
Buffet Dinner 7:00 p.m.

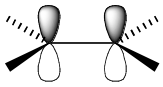
Cost $25, $15 for students

**Fairdale Banquet Center**

672 Wherle Dr.
(corner of South Forest and Wherle)
Amherst, NY

Please send your reservation information to Alice Steltermann (716-888-2340, stelter@canisius.edu) by Monday April 20, 2009.

Ron Spohn,
Chair, Education Committee



## GRANTS AVAILABLE FOR GREEN CHEMISTRY RESEARCH

Green chemistry researchers could get a boost from the recently approved American Recovery and Reinvestment Act of 2009.

"Green chemistry and engineering for drug discovery, development and production" has been identified by the National Institute of General Medical Sciences as one of the specific challenge topics for the $200 million "NIH Challenge Grants in Health and Science Research" initiative, which is part of the recovery and reinvestment act.

Award grants of up to $1 million each are available to help quickly advance the area in significant ways.

March 27-April 27 is the submission timeline for RFAs (requests for applications).

The Challenge Grant RFA is available at http://grants.nih.gov/grants/guide/rfa-files/RFA-OD-09-003.html .

A complete list of NIGMS Challenge Topics can be found at http://www.nigms.nih.gov/Research/ChallengeAreas.htm. The green chemistry and engineering topic area is listed as 06-GM-109.

**60 YEARS AGO IN *THE DOUBLE BOND***

*The following excerpt, by C. Merrill Brown, appeared in the April, 1939 Double Bond*

DAHLIAITIS

If you want a gardening hobby that will give you something to think about every month in the year, grow the king of the fall flowers, the one that is in its glory when most of the others have bloomed and faded, the one which for variation in type, size and color has no equal, the crowning glory of them all, the dahlia. If you want a "live" hobby, one in which the pleasure derived therefrom depends entirely upon your own industry and intelligence, dahlias will answer the purpose perfectly. No flower suffers more from neglect than does this one, but at the same time, no flower will produce a greater measure of satisfaction in a job well done than will a well grown dahlia in full bloom in the fall months.

Naturally, what has been said above applies to what one ordinarily thinks when the word "dahlia" is mentioned. They picture in their mind those mammoth blooms of brilliant color and varied formation which they may have seen in Victoria Park, in someone's garden or at a fall flower show. They think of the kind that never fail to excite admiration and wonderment whenever seen and many wish that they could grow flowers like that. The truth of the matter is they can if they have the space and are willing to do what needs to be done.

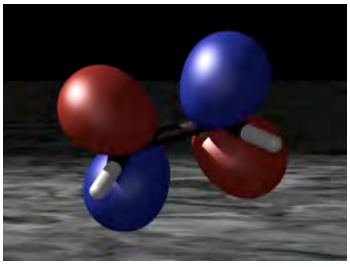
This dahlia is a man's flower, but not for a lazy man. Its care and cultivation is more than a hobby - it is a ritual. Success is not often achieved with the first attempt but comes only after considerable experience, reading, experimentation and consultation with other growers. But, once the tricks have been learned, nothing short of a catastrophe will cause them to be given up. No collection of dahlias will perform perfectly year after year. The one that was your pride and joy last year may turn out to be a perfect failure this year. In other words, dahlias are somewhat temperamental and only expert knowledge and care will keep them under control. A healthy, thriving plant is never temperamental. The main thing is to keep them growing and free from disease and insects. If the latter are controlled by regular weekly spraying or dusting, the former will take care of itself. The statement that you get out of it just what you put into it never had a better illustration than is afforded by the dahlia.

Not only is the dahlia a man's flower, but it is also a chemist's flower. A knowledge of soil chemistry and fertilizer action is most desirable. The testing of the soil for acidity and the various essential elements, the balancing of fertilizers to meet soil deficiencies, the use of insecticides, sprays and dusts all fall within the province of the chemist. The soil should be slightly acid rather than alkaline, a pH of 6.2 to 6.4 seems to work well. Too high an alkalinity produces more bush than flowers. Too much nitrogen works the same way and also weakens the roots so that they do not winter well. The dahlia is a gross feeder but prefers potash and phosphorus. This means that commercial fertilizers low in nitrogen are better than manure. The latter, as well as well as peat moss may be used to lighten the soil, but should be applied in the fall or early spring and dug in immediately. They serve to impart what the English call "tilth" which we might describe as increasing the porosity and water holding properties of the soil. Bone meal, in generous applications, with potash added towards later summer is the safest and best general fertilizer.

For the real enthusiast, dahlias grown from seed offer the greatest attraction for one never knows what to expect until it arrives. There is always the possibility that he may be the first to obtain a really blue dahlia. Such a flower would be worth a small fortune. Seeds are usually planted about the first of April in the greenhouse. They germinate in five to fifteen days and when three inches high are treated the same as the cuttings. A seedling may produce any type of dahlia. But if one is obtained which is really outstanding (the odds are about 1,000 to 1 against you ), it must be carefully protected over the winter and then grown two more years to make certain that it will hold true to type. It is then sent to the official trial gardens where it is rated by experts. If it scores 85 or better it is then ready for the market. Every dahlia "nut" has a few seedlings in his patch every year and also grows his own plants from cuttings, if not in his own greenhouse then in one in his locality.

The dahlia family is a big one. There is the American Dahlia Society which publishes an official bulletin four times a year and which conducts an annual show. Several books on dahlia culture are available also.

The true dahlia lover will be a hard worker, he will know practically all the people in his vicinity who grow his favorite flower, he will visit with them often and spend many hours talking "shop", he will subscribe to the magazines and hold membership in the national society, he will know the commercial growers from whom he buys his new stock, he will visit some of the fall flower shows and he will always be broke.



## THIS MONTH IN CHEMICAL HISTORY

By Harold Goldwhite

April, like most months, is rich in anniversaries of scientists who made major contributions to chemical sciences. Among them are James Watson, Robert Woodward, Carl Lindemann, and Glen Seaborg. But I choose to discuss the career of a great physicist whose work made such an impact on our science that it changed the thinking and work of every chemist who followed him. I refer to Max Karl Ernst Ludvig Planck, born in Kiel, Germany, on April 23, 1858.

The Planck family had, in common with the family of J. Clerk Maxwell, a long history of public service as lawyers, scholars, and clergymen. Planck's father was a professor of law. The family moved from Kiel to the independent state of Bavaria when Max was 9 years old. He attended the Maximilian Gymnasium in Munich, where he chose an emphasis on physics over music (he remained an excellent pianist all his life), perhaps through the influence of his physics teacher H. Muller. His experience for his first 3 years at the University of Munich was less inspiring, and he transferred to Berlin, where he encountered two distinguished physicists as teachers. Kirchhoff, the collaborator of Bunsen in spectral analysis, apparently delivered his polished lectures in such a manner as to put many in his audience to sleep. Helmholz, the great expert on electrical and optical phenomena, was often unprepared and difficult to follow.

Planck read widely in physics and decided to specialize in thermodynamics, after reading some of Clausius's work. His doctoral thesis, which included a critique of Clausius's views on irreversibility, was successfully submitted to the University of Munich in May 1879. It is worth noting that some of Planck's results had already been published by J. Willard Gibbs in a very long article published in the somewhat obscure *Transactions of the Connecticut Academy of Sciences*, an article that was not brought to the attention of the European thermodynamicists for decades. On the strength of his thesis, Planck was appointed Privat-Dozent at Munich and then in 1885 was called to Kiel as Extraordinary Professor of Theoretical Physics.

In 1889, on the death of Kirchhoff, the prestigious University of Berlin asked Boltzmann to succeed him. Initially, he accepted, but then changed his mind. In his place, the somewhat unlikely choice was the young 34-year-old Planck, who was appointed Professor in 1892, becoming a colleague of the great Helmholz. Planck remained at Berlin for the rest of his professional career, retiring in 1928. His successor was Schroedinger.

Planck's work before he ascended to the Berlin Chair was collected in his important thermodynamics text, published in 1897, and included discussion of chemical potentials and their applicability to equilibrium constants; dissociation of real gases; and the thermodynamics of colligative properties, including freezing-point depression and osmotic pressure. These treatments of really fundamental chemical and physical problems led him to the forefront of classical thermodynamics.

At Berlin, he began to turn his attention to emissivity phenomena, the so-called black-body radiation. His predecessor, Kirchhoff, had provided theoretical backing for the observations that the distribution of radiant energy with wavelength (or frequency!) emitted from a heated enclosure did not depend on the material of the enclosure. It was therefore a quite general or universal result. In 1893, Wien had used experimental data to derive his displacement law, which connected the enclosure temperature with the frequency of maximum energy output. The efforts of some of the best physicists of the day, including Rayleigh and Jeans, were able to explain parts of the Wien law at low frequencies and high temperatures, but failed at other extremes. The field was open for Planck's efforts.

When Planck tried to apply Boltzmann's statistical formula for entropy to the problem, he found he had to assume that the enclosure walls were composed of electrodynamic oscillators, which could only emit energy that was not infinitesimally variable but was connected to the oscillator frequency by the now-famous formula $E = h\nu$, where h is what Planck called a quantum of action. Later generations dubbed it Planck's constant. Planck obtained a value for h from experimental data that is close to the currently accepted value. He introduced these new ideas in two presentations to the German Physical Society in Berlin on October 19 and December 14, 1900. Their impact was to be felt throughout 20th-century science.

At first, however, Planck's novel view of radiation, while it was agreed to be interesting, was viewed as a kind of formalism: a way of accounting for the data without necessarily providing a fundamental physical explanation of the phenomena underlying it. Boltzmann was impressed, and Planck himself is supposed to have told one of his sons that he had made a discovery that was in the class of one of Newton's. But he was still trying classical approaches to the problem until finally, toward the end of his career, he wrote: "My vain attempts to somehow reconcile the elementary quantum with classical theory continued for many years and cost me great effort…. Now I know for certain that the quantum of action has a much more fundamental significance than I originally suspected."

This article has been greatly aided by the following sources: *A Biographical Dictionary of Scientists*, Trevor I. Williams, Ed., Wiley, 1982; *From X-rays to Quarks*, Emilio Segre, Freeman, 1980; and *The Strange Story of the Quantum*, Banesh Hoffmabnn, Dover, 1959.

## WNYACS Officers & Staff



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