SCIENTIFIC ROMANTICISM: A SKETCH OF ANTOINE LAVOISIER Part 1 .....p. 5

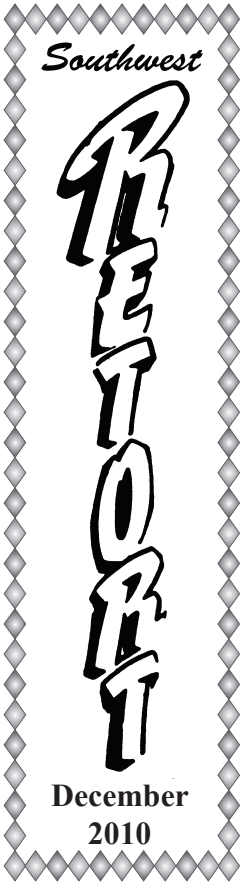

TABLE OF CONTENTS

INDEX OF ADVERTISERS

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The winner of the ACS Southwest Regional Award was **Dr. Edward S. Amis** of the University of Arkansas. His award address, "Stewardship of Mind," was published in full in our magazine and took up ALL of the December, 1960, issue. Amis started off quoting in their entirety three poems: "The Duel" by Eugene Fields; "The Wonderful One Hoss Shay" by Oliver Wendell Holmes; and "The Church's One Foundation" by Samuel J. Stone. Amis cited these poems as illogically illogical, illogically logical, and logically logical. He went on to state that the important goal of education was training of the mind. There are four aspects of this goal: (1) How are innately capable and original minds to be spotted? (2) What provisions can be made to see that such minds have the opportunity to be trained? (3) What are the best methods for training such minds? (4) When trained, how can such minds be given the maximum opportunity to be productive?

Amis went on to discuss how these questions affected the training of scientists. He had the belief that large institutions were better for the training of the mind, a belief controversial even today. Finally, he dealt with the question of how scientific training was important in view of the challenges in science and technology raised by the Soviet bloc. You present day readers may think this just a relic of Cold War thinking, but such questions still arise today, with the challenges in economics, science, and technology raised by Communist China and other rising Asiatic powers.

BRENNA TUCKER OF TWU TO BE HONORED. Texas Woman's University chemistry graduate student **Brenna Tucker** will receive one of four prestigious scholarships given by TWU at the Ninth Annual Virginia Chandler Dykes Leadership Award Luncheon held at the Belo Mansion on Feb. 17. Tucker expects to receive her master's degree in chemistry this summer. Additionally, she received the William F. Giauque Memorial Award presented by the North American Calorimetry Conference, where she gave a presentation on her research.

Southwest Retort

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Southwest Retort

SIXTY-THIRD YEAR December 2010

SCIENTIFIC ROMANTICISM: A SKETCH OF ANTOINE LAVOISIER PART ONE

by Amanda Strickland
Completed November 14, 2010

Editor's Foreword. *As incoming Chair of the ACS Division of the History of Chemistry, your Editor always rejoices when undergraduate students take an interest in the history of chemistry. Amanda's article is particularly appropriate for this time, as we are entering the International Year of Chemistry, with its unifying theme, "Chemistry---our life, our future." Antoine Lavoisier can very reasonably be considered the Father of Chemistry.*

The inspiration for Amanda's Lavoisier biography came from a Fall, 2009, term paper assignment for Amanda's honors organic chemistry professor, Dr. David Bergbreiter. Students had to write a biography about a famous chemist. Amanda originally chose Antoine Lavoisier because she simply wanted to exercise her French skills and read primary sources in the original French. When Dr. Bergbreiter suggested that Amanda watch the play "Oxygen" and contact the authors (Drs. Roald Hoffmann and Carl Djerassi), she decided to go beyond the scope of the paper. With his encouragement, she changed the assignment into a semester research project, conducting interviews with members of the ComitéLavoisier of the Académie Française des Sciences (Jean-Pierre Poirier, Henri Kagan, Patrice Bret) and consulting primary documents from Cornell University. The finalized, full-length biographical sketch was later edited to fit the page limit for the term paper and then edited some more for publication in The Retort.

Amanda, an honors undergraduate student, is a biology major/French minor at Texas A&M-University-College Station. She is graduating this May and will attend medical school in the Fall. She is an Honors Undergraduate Research Fellow; her wide research interests include inorganic chemistry, history, and

French translation. She knows seven languages. In her free time Amanda likes to read, cook, and learn foreign languages and cultures.

INTRODUCTION

A few days after Lavoisier's execution, the Italian-born mathematician Joseph Louis Lagrange (1736-1813) made his now famous lament: "It took them only a moment to cut off that head but a hundred years may not suffice to produce a similar one." Survivors of the Revolution who were angry at his unjust death kept his memory alive; thanks to them and his work, Lavoisier is known as the Father of Modern Chemistry, a pioneer in biology, physiology, social reform, and many other fields, even mistakenly as the first person to discover oxygen. Someone familiar with only bits of Lavoisier's life, and of his tragic end, might consider the famous 1788 David portrait of him and his wife an illustration of a talented scientist who thrived in the calm before the storm of the revolution. But he was much more than a bewigged 18th century French aristocrat/scientist who had the misfortune of being guillotined. This biographical sketch aims to provide a personal profile of Lavoisier to shed more light on the privileged and talented man behind the discoveries.

EARLY LIFE AND EDUCATION

Antoine Laurent Lavoisier already had the advantage of privilege. Born in Paris on August 26, 1743 to Jean-Antoine Lavoisier and Emilie Punctis, he came from a long line of prominence and talent. His frail mother died on March 24, 1746. As a child, Antoine was very solemn (1), possibly from the early loss of his mother. His preference for studying over playing was a trait that carried over into his adult life.

Jean-Antoine sent 11-year-old Antoine to the Collège Mazarin, also called the Collège de Quatre Nations. This was the only local institution at the time where students learned science and math as well as history and literature. The boy favored literature and even aspired to be an author. Interestingly, some of his essays covered ethics-related topics like the dual importance of propriety and accuracy while searching for the truth. He did not initially appreciate chemistry because he found the subject vague, incomplete, and based upon poorly-defined information (2).

The year 1760 marked tragedy in the Lavoisier family: Marie Marguerite Emilie, Antoine's younger sister by two years, died at age fifteen. The grieving family shifted all attention to the intelligent and promising Antoine. In 1761, he left the Collège and transferred to the Faculty of Law. Following a three-generation family tradition, he became a lawyer, receiving his baccalauréat in law in 1763 and his licentiate in1764. Meanwhile, he wrote his first scientific paper. In it, his diction and syntax reflected more literariness than apt scientific experience (3).

But by the time Lavoisier started studying the law, he had already become interested in science, influenced by an instructor at the Collège Mazarin. Abbé Nicolas Louis de La Caille (1713-1762) was a celebrated professor and an assistant astronomer at the Royal Academy of Science (4). La Caille's emphasis on quantitative science intrigued Lavoisier, sparking a lifelong love of meteorology and geology. Lavoisier also spent several summers shadowing botanist Bernard de Jussieu (1699-1777) (5). Jean Etienne Guettard

(1715-1786), Jean-Antoine's friend and himself a member of the Royal Academy, soon focused Antoine's interest on geology and chemistry.

ENTRANCE TO THE *FERME* AND THE ACADEMY

The profession of law did not enamor Lavoisier, and he knew that the Royal Academy did not give much financial support to its members. Thus he turned to the *Ferme Générale*, a private company that collected taxes for the king. In May 1768, just sixteen days before he was admitted to the Royal Academy for his early research and scientific potential, Lavoisier bought into the *Ferme* and became an adjunct. This was a financially wise move, but the connection would be a downfall for him years later (6). Lavoisier was involved with the Tobacco Commission at the *Ferme*. His supervisor was Jacques Paulze de Chasteignolles (or Jacques Paulze), who thought highly of the young man and soon came to him with a time-sensitive proposition.

MARRIAGE

In 1771, Paulze's thirteen-year-old daughter Marie-Anne Pierrette left her convent school to return home and serve as her father's hostess. Her mother had died ten years earlier. But when she arrived, she caught the attention of 50-year-old Count d'Amerval, a man who was closely related to Paulze's boss. Desperately needing money, the Count pressured Paulze to let him marry Marie-Anne. But when she rejected the idea, Paulze supported his daughter, citing his desire to not force her to marry against her will (7). Aware that this threatened his job security, Paulze immediately thought of 28-year-old Lavoisier, who had visited the Paulzes' home several times. He and Marie-Anne happily spent time playing romantic board games and discussing science. Lavoisier was undoubtedly the right choice for his daughter (8). Both Antoine and Marie agreed to the union, and their engagement was announced in November 1771. The Count was unhappy but peacefully relented. The couple married on December 16, 1771.

Not only did they fall in love, but each brought a sizeable amount of money to the marriage: Marie-Anne's father gave her 80 000 livres over six years, (roughly US$ 300 000 in 2008) while Lavoisier received 420 000 livres (about US$ 2.5 million in 2008) as advance inheritance from his parents (his father died shortly after the marriage) and inheritance from two of his aunts (9).

The marriage was a happy one. Marie-Anne was her husband's secretary, learning English to translate letters, papers, and other important documents (Lavoisier was never good at languages). Her convent education served her well, and she took drawing lessons from celebrated painter Jacques-Louis David (1748-1825), who painted the 1788 portrait of the couple. Also called Lavoisier's philosophical wife, she played a vital role in his research, from sketching equipment and recording measurements in his laboratory to preserving his legacy after his death. Marie-Anne was pregnant in 1774

(10), but to their disappointment, they never had any children.

SCIENTIFIC HABITS

Lavoisier completely immersed himself into his work. He seems to have not involved himself with any

kind of vice-related scandal; he always demonstrated great diligence and drive. He could afford his own laboratory, and he spent a lot of time there. He would devote six hours a day to science, working there from six to nine in the morning, and after dinner from seven to ten o'clock at night. He employed the rest of the day for work at the *Ferme*, the Royal Academy, and other professional requirements. One day per week was saved for his own experiments. Years later, Marie-Anne reflected on his dedication, describing how happy he was when friends joined him there in the morning to dine and work with him (11). Unlike many of his contemporaries, Lavoisier left nothing to chance; he carefully planned his experiments before executing them.

LAVOISIER'S NEW IDEA AND OXYGEN

Lavoisier had shown interest in the composition of air as early as 1766 (12). In October 1772, he tried burning phosphorus and discovered that it combined with air to produce phosphoric acid. Also, the weight of phosphorus increased upon combination. The same happened with sulfur, and he concluded that air combines with metals to form calces, oxidized metals that release air upon reduction (13). These were revolutionary thoughts because they disagreed with the currently accepted phlogiston theory, in which burning materials give off a gas called phlogiston.

Extraordinary theories require extraordinary proof. In 1774 he submitted a memoir describing the results from his phosphorus and sulfur experiments, as well as his modified repetition of Robert Boyle's (1627-1691) calcination experiment. He used weighed amounts of lead and of tin and found that the heated metals had gained weight from combining with the air from inside the sealed vessels, unlike Boyle's conclusion that external air had entered the containers by the pores and had combined with the metals. This further proved his theory of the contribution of air (14).

A month before Lavoisier officially presented his memoir to the Academy in 1774, the British minister-scientist Joseph Priestley (1733-1804) visited him in Paris and told him about a new kind of air he had just isolated. In a paper published in March 1775, Priestley described how he had obtained a new kind of air that was seemingly better than ordinary atmospheric air. He called it dephlogisticated air because it contained less phlogiston than atmospheric air (he believed that hydrogen was phlogiston itself because it caught fire so easily) (15). Lavoisier and his wife were surprised to hear Priestley's new findings, as Priestley recalled years after Lavoisier's death. In reality, Priestley had discovered oxygen, which had nothing to do with phlogiston.

Around 1772, Swedish scientist Carl Wilhelm Scheele (1742-1786) found that heated manganese oxide released a new kind of gas that he called fire air. The properties he described match those of oxygen, but he credited them to phlogiston. In a letter to Lavoisier dated September 30, 1774, he described his results and asked that Lavoisier perform his protocol to make this fire air (16). He did this because he knew that Lavoisier, a well-established scientist, had excellent laboratory equipment. He evidently also trusted Lavoisier. However,

Scheele never received a reply. It is unclear whether Lavoisier did not know of the letter or simply did not answer it. Madame Lavoisier's role in this is questionable; she handled much of her husband's correspondence. Jealous about his reputation, Lavoisier always sought to show everyone that he discovered oxygen first. Thus it is possible that he chose to ignore the letter. But Lavoisier did not discriminate: he felt similarly about other scientists, including Joseph Priestley (17).

Beginning in April 1775, and later in a revised paper in 1778, Lavoisier described this new air as a part of the atmosphere that was specific to respiration and a contributor to burning. Because phlogiston theory was so widely accepted, Lavoisier was careful with publishing his findings. He too doubted if his new ideas could hold up against a centuries-old theory, but after reviewing Priestley's information and confirming his questions with Scheele's research, he had no reason not to go on (18). Considering that Scheele had discovered oxygen in 1771 (but announced it in 1777, for he feared accusations of plagiarism), that Priestley had published about the same gas in August 1774 (but still supported phlogiston theory), and that Lavoisier published in 1778 with definitive quantitative analyses about oxygen (19), Lavoisier was actually last to discover oxygen. But Lavoisier was the first to correctly explain the principles behind oxygen, leaving the phlogiston theory officially debunked in 1778. No one would discuss Lavoisier's work until a decade later. The first person to publically accept his new theory was the chemist Claude Louis Berthollet on April 6, 1785 (20). The scientific world that Lavoisier lived in was a stubborn one.

CHEMISTRY OF LIFE

By 1776, Lavoisier had determined that eminently breathable air made up about one-fifth of atmospheric air, the rest he called a *mofette*, a gas (nitrogen) that could not sustain breathing and burning. From sixteen experiments conducted in October 1776, Lavoisier discovered a direct relationship between the amount of oxygen in the setting and how long various animals lived. He also discovered that the animals fixed the air they breathed into a form (carbon dioxide) that did not cause calcinations. He believed that internal combustions in the lungs caused this fixation. On May 10, 1777, at a meeting at the Academy of Sciences, Lavoisier discussed respiration and concluded that air had three components: the *mofette* above the other two layers because it was the lightest, oxygen in the middle, and the fixed air at the lowest level (21).

On November 17, 1790, he and Armand Seguin (1767-1835) published "The First Memoir on Animal Respiration." That same year, from experiments using an airtight suit, they found an increase in oxygen consumption after eating and/or exercise. Meanwhile, Madame Lavoisier recorded data that Lavoisier called out to her and sketching what she saw. Two plates that she made depicting these experiments in exquisite detail still survive (22).

OTHER ACCOMPLISHMENTS

Lavoisier became a full Farmer-General in October 1779. He became involved in several committees and found ways to cut expenses and

increase productivity. As a scientist, he was disturbed by the extreme poverty that he saw during his field trips; as a Tax-Farmer, he sympathized with the hard-working and underprivileged that made up the majority of France. When the Clermontois district was under his control, Lavoisier abolished a tax forced upon Jews called *pied-fourchu*. Grateful, the Jews in Metz sent a delegation to Lavoisier to thank him (23) and offered Passover cakes to demonstrate religious fraternity (24).

Lavoisier's studies on oxygen and respiration helped him while he worked on prison reform and hospital renovations. Both places had notoriously poor hygiene and crowded spaces; Lavoisier helped redesign drainage systems and called for better ventilation (25). Real-world applications of his scientific findings, by his doing or influence, include industrial hygiene improvement, food spoilage prevention, improved sugar purification, and safer hat-making methods (26).

In the late 1770s, Lavoisier led the Gunpowder Commission of the *Ferme* and worked to produce cheaper, better quality gunpowder. The *Ferme* saw a rise in the manufacture of saltpeter, a major ingredient. This created new jobs and boosted France's status to being Europe's best gunpowder producer. With a new surplus, France became the leading exporter of gunpowder to America during their Revolutionary War (27). Lavoisier directly negotiated with the American envoy Benjamin Franklin (1706-1790), and the two became friends. Like Franklin, Lavoisier hoped for a peaceful change to democracy without a bloody revolution (28).

PERSONALITY AND CHARACTERISTICS

With his talent, accomplishments and disposition, people probably either loved or hated the ambitious Lavoisier. While he was honest in his work, he loved recognition and scientific enlightenment equally. He did not allow others to take what he believed he deserved, caring little about his contemporaries' ambitions. Biographer Jean-Pierre Poirier wrote that "he loved Humanity, seen as an abstract concept, but he did not like men" (29). He had few close friends; the only two he truly considered as such were his wife and his father. This probably stems from his early years, when he shared an extremely close friendship with his father. This may have caused him to believe that such kinds of relationships with family members were sufficient (30).

But he had a softer side. He enjoyed music, had a box at the opera, played the piano, and even mused about harmony in some of his writing (31). He was mindful of his Catholic upbringing, but he was neither a radical atheist nor a strict Catholic (32). His moments of peace often came when vacationing in Villers-Cotterets, a place north of Paris from where his family hailed.

Multiple sources describe Lavoisier as being tall with light brown hair and brown eyes, an aquiline nose, and a prominent forehead. His soft eyes often had a severe expression that, along with his stiff attire and grace, gave others the impression of aloofness and rigidity. But he was actually a shy person; when he was younger, he would avoid social activities by claiming illness. He had great

******Continued on Page13******

***RETORT* MAILING DELAYS AND ROSTER UPDATES. PART 2.**

With the use of the updated roster, we presume that everyone in the D-FW Metroplex received a *Retort* who was entitled to one. Regrettably, we have received permission to update the rosters of only one of our other five member sections. The situation is complicated by the fact that Jan. 1 marked the changeover to new sections chairs. We hope to have the situation resolved by our next issue.

Around-the-Area

University of Arkansas

A number of UA chemistry students are recipients of scholarships. Winners of DuPont scholarships are **Grant Meredith, Ashley Rosenberg,** and **Molly Steen**. The winner of the Arthur and Lois Fry Scholarship is **Gayatri Suresh Kumar**. Jacob Sacks Scholarships were given to **Christopher Duvall, Shannon Mumma**, and **Ettore Rastelli**. William K. Noyce Scholarships were won by **Ross Harmon, Jonathan Schmidt**, and **Mary Smith**. **Ethan McBride** won an Octa N. High Scholarship. **Feng Chen** successfully defended her doctoral dissertation, while **Adam Kreidermacher, Benard Omogo** and **Ashley Ramsey** passed enough cums to become official doctoral candidates.

A number of faculty and students attended Pacifichem in Honolulu Dec. 15-20. **Bob Gawley** organized a symposium there and presented a paper with grad student **Tim Beng**. Faculty member **Matt Macintosh** and grad students **Sefat Al-Warsh** and **Abby Hubbard** presented papers. Also attending were faculty **Ingrid Fritsch** and **Charles Wilkins** plus grad students **Maher Abu-Libdeh, Leanne Mathurin, Brett Spann, Liz Srader** and **Cody Wright**. **Matt McIntosh** gave a seminar at the University of Tulsa in November.

The Arkansas Center for Space and Planetary Sciences celebrated its 10th anniversary Dec. 8-9. **Derek Sears** presented "The Early History of the Keck Laboratory." He is a cofounder and former director of the center.

Wichita Falls-Duncan

Here are the new officers for 2011: Chair, **Dr. Jeremy Holtsclaw,** Halliburton; Chair-Elect, **Ms. Rebecca Eden**, Cameron University; Secretary, **Mr. Gregory Cook**, Cameron University; Treasurer, **Dr. Jianguo Shao**, Midwestern State University; Councilor, **Dr. Keith Vitense**, Cameron University; Alternate Councilor, **Dr. P. K. Das**, Cameron University.

South Plains

Texas Tech University. Associate Professor Jorge A Morales presented an invited lecture on Nov. 1 at the École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland. He also presented a poster with coauthors **Patrick M. McLaurin** and **Shawn Hinds** at the Cancer Prevention and Research Institute (CPRIT) Conference held in Austin Nov. 17-19. **Welch Professor Bill Poirier** was awarded with a "Professeur Invite" (invited professorship) by the French government (Centre national de la recherché scientifique) for an extended summer 2011 visit to

interact with researchers at Montpellier 2 University in the south of France. This collaboration will explore the incorporation of quantum effects into trajectory simulations.

Dallas-Fort Worth

Local Reporter Tracy Hanna, TCU (t.hanna@tcu.edu)

SMU. Dr. David Son gave an invited talk at the XI Andrianov Conference in Moscow in Sept. His talk was titled "Thiol-Ene Chemistry for the Synthesis and Modification of Highly Branched Organosilicon Polymers."

Brent Sumerlin was invited to join the Editorial Board of the journal Macromolecular Rapid Communications. He gave seminars at Georgia Tech and Virginia Tech. He also gave a plenary lecture at the International Symposium on Stimuli-Responsive Materials in Hattiesburg, MS and gave an invited lecture at the SWRM/SERMACS meeting in New Orleans."

TAMU-Commerce. A&M-Commerce faculty and their students gave seven presentations at the SWRM /SERMACS ACS Regional Meeting held in New Orleans Nov. 30-Dec. 4. The faculty members were **Ben Jang** and **Stephen Starnes.** Student co-authors were **Lakshmi Koya, Khoa Nguyen, Eli Hunt, Hikma Jemal, Jeffery Sun, Carlos Tovias, Christina Castle, Nathaniel Hanson, Navid Rivas, Jeremiah Secrest, Patricia Rhodes,** and **Qianying Zhang.**

UT-Dallas. Dr. Warren Goux attended the annual Society for Neuroscience Conference in San Diego, where he presented a poster on "Neuron-Selective Toxicity of Tau Peptide in a Cell Culture Model of Alzheimer's Disease and Neurodegenerative Tauopathy." Faculty attending and giving research papers at SWRM/SERMACS in New Orleans were **Drs. Gregg Dieckmann, Paul Pantano, Dennis Smith, John Sibert**, and **D. J. Yang**. **Professor Rocky Draper** was given a Phase-1 NSF SBIR Award with Medical Nanotechnologies, Inc. for photo-thermal ablation of tumors with targeted carbon nanotubes.

TCU. Welch Professor Eric Simanek attended the SWRM/SERMACS Regional ACS Meeting in New Orleans with seven TCU undergraduates, who presented two posters: one on their research into hyper-branched polymer synthesis; the other on their participation in chemistry outreach at the Fort Worth ISD science night. **Tracy Hanna** attended the same meeting to present "Bismuth Aryloxides: Monodentate, Chelating, and Calixarene Ligands" in the Main Group Organometallic Symposium.

UT-Arlington. Dr. Martin Pomerantz presented a paper co-authored with **Nasahat Turkman** on "Intra- and Intermolecular Interactions in Bi- and Terthiophenes: Structural Implications" at PACIFICHEM 2010 in Honolulu, Dec. 15-20. A special seminar was given on Dec. 8 by **Dr. Thomas J. Wenzel** of Bates College on "The Use of NMR Spec-troscopy for Chiral Discrimination."

******Continued from Page 10******

concentration skills and a strong curiosity about everything. His intelligence made him, as described in Poirier's biography, "sharp, penetrating, analytical, and very critical" (33). Although he was not particularly quick-witted, he clearly showed dedication to his work. Once, in his youth, he stopped

eating and only drank milk because he was so occupied with study (34).

He was happily married and proud of his wife's charm, intellect, and devotion. He acknowledged her help in drawing and translating, but he always thought of her as his secretary and assistant. No evidence survives indicating that he considered her a collaborator, though she clearly had a good technical understanding from the kind of work she did. She was undeniably intelligent and capable of working alongside him. She was also interested in her husband's work, and she was certainly aware that the times she lived in prevented her from gaining as much public success as her husband in this field. So could he have stolen scientific ideas from her, with or without her consent? Although a counter-argument cannot be denied, the answer is most likely no. All of his greatest accomplishments are most likely his, and he did give her some credit for her work. Roald Hoffmann mused that perhaps he could have given his wife more credit, and overall "I think in part of their work it was a collaboration" (35). Jean-Pierre Poirier noted that although Lavoisier knew no English, he did control Marie-Anne's translations and even made his own corrections to his work. Patrice Bret, Secretary General of the Comité Lavoisier, stated that Lavoisier's additions did improve the manuscripts (36).

No matter how others felt, Lavoisier's career progressed. By the late 1780s, colleagues accepted his work; instructors now taught his ideas in schools. The Chemical Revolution was complete.

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******Continued on Page 16******

FEBRUARY D-FW ACS MEETING JOINT WITH THE FORT WORTH LIFE SCIENCES COALITION WEDNESDAY, FEBRUARY 9, 2011

"FROM BEHEMOTH TO BARELY VISIBLE: THE EVOLUTION AND FUTURE OF SCIENTIFIC INSTRUMENTATION"

About the Topic: Instrumentation is a significant aspect of nearly every science, yet its role is often overlooked or even minimized. Join us for an interesting program (not all finalized) on scientific instrumentation's origins—and what to expect in the future.

Confirmed Speaker: Dan Quinn, Regional Instrumentation Manager, National Instruments.

Moderator: Pat M. Cappelletti, Manager, Post-Market Surveillance, Alcon R & D.

Location: Arts 5th Avenue, 1628 5th Ave at the NW corner of 5th and Allen Avenues in the Fairmount Southside Historic District of Fort Worth.
Live Music; Desserts by Z's Café; Beverages

Time: 7:30-10:30 p.m**.**

To Attend: $10 cash or check at the door; $5 students with valid ID.

Response Deadline: Monday, Feb. 7: info@fwlsc.org. Guests are welcome. Drop-ins are welcome too---but responses are **greatly** appreciated.

To add a slide to the .ppt Scroll. $10; Students and student group $5. All slides due Monday, Feb. 7 to info@fwlsc.org.

Many thanks to our Sustaining Co-Sponsor: Fresnel Technologies, Inc. and to our Supporting Organizations: Dallas Forum for BioMedical Technology(www.dfbt.org); The Health Industry Council(www.healthindustrycouncil.org);bioDFW (www.BioDFW.org), and TechFortWorth (www.techfortworth.org).

March D-FW ACS Meeting: "D-FW Award Winners" Weston T. Borden, UNT, James Flack Norris Award in Physical Organic Chemistry and Purnendu (Sandy) Dasgupta, UT-Arlington, ACS Award in Chromatography. Monday, March 7, 6-9 p.m., Dallas Baptist University. Watch http://acsdfw.org/ for details.

PERIODICAL

****Continued from Page 14****

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