THE OCTAGON

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In This Issue:

LVACS Second Annual Welcome Back Picnic!
A Fun Family Event!

When: Saturday, August 13th, 2005
Time: Noon to Dusk
Where: **Louise B. Moore County Park**

NO CHARGE!!

Northampton County owns this 125-acre park near Country Club Road in the southeastern part of Lower Nazareth.

Facilities include: baseball/softball fields, volleyball courts, a badminton court, playground equipment, tennis courts, pavilions and picnic tables.

Bring your baseball, badminton, and tennis equipment and let's have some fun!

We will also have an ice-cream-making contest using liquid N_2!!! Details to follow.

Please feel free to bring a covered dish of any kind. Let us enjoy the aromas and flavors of your culinary talents! Bring your family for a fun time and meet your ACS colleagues!
We will provide hot dogs, hamburgers, soft drinks and water.

We can discuss National Chemistry Week ideas, and if you want, feel free to bring demonstrations and / or ideas. This is a great informal setting to have fun and relax!!!

April Meeting Minutes

Editor's Note: My apologies, minutes for the February and May meetings were not received in time for publication in this year end issue.

The 779th meeting of the LVACS was called to order by Chair Tara Baney at approximately 7:30 PM on Wednesday, April 27th, 2005; Student Awards Night. Moravian College hosted the meeting on their campus. Prior to the meeting proper, a number of our 50-year members were present to accept their certificates and provide a few words of wisdom. This was a very special moment for the section, and the members in attendance enjoyed the antidotal stories and real-life advice. The LVACS thanks Ms. Mary Lee, Dr. Heinz Pfieffer, and Dr. Clarence Murphy for their time and inspiration! The additional members celebrating this wonderful milestone are as follows: Mr. Robert Eltonhead, Dr. Max Robbins, Mr. Frank Schaefer, and Mr. Clyde Wallingford. Congratulations!!

In addition, the poster session was a huge success again! Seventeen posters were displayed before dinner, and the students were available to detail their research for attendees. Excellent job students, and best of luck with your varied and exciting future endeavors! The winner of the travel award was Rachel Koralewski from Moravian College. Her poster title was *Mechanistic Model for Nicotinamide Coenzyme Mediated Reduction Reactions*.

Prior to the speaker's talk, the latest demographic information from National was presented. If anyone is interested in a copy of the slides, please contact Tara Baney.

Next the ACS Award winners were announced. A faculty member at their respective institution introduced the following students:

College/University	Student Award Recipient
Albright College	Kimberly J. Bush
Alvernia College	Kevin Sonon
Cedar Crest College	Laura Anderson
DeSales University	Michael Huston & William Farina
East Stroudsburg University	No awardee in 2005
Kutztown University	Tom Healy
Lafayette College - Chemistry	Ryan T. Evans
Lafayette College - Chemical Engineering	Damian Gill
Lehigh University – Chemistry	Jonathan J. Havel
Lehigh University – Chemical Engineering	Alefiyah Shambhoora
Moravian College	Rachel M. Koralewski
Muhlenberg College	Anne DeSimone & April Richardson

All students were applauded for such a wonderful achievement.

Al Martin introduced our speaker for the evening, Dr. Larry Murrell. The title of Dr. Murrell's talk was "Sols and Mixtures of Sols as a Way to Prepare Unique Materials." Dr. Murrell began with a visual of gelation of colloids, or sols, by describing them as many marbles surrounding a basketball. There is much discussion regarding a scientific definition of sols, and the terminology overall needs to be clarified in the industry. Dr. Murrell detailed the current definitions of colloids and sols with the most accepted terminology and schematics. He noted that destabilization results in precipitation or gelation of materials; this occurs due to heating. Destabilization by pH usually occurs at neutrality; high pH keeps sols stable whereas low pH is considered a metastable state.

Dr. Murrell also discussed in detail the differences between $Al(NO_3)_3$ and $Ce(NO_3)_3$ as sol precursors. A mixture of the two are also used as precursors, and frequently there is phase segregation into amorphous mixed oxides at >600˚C. Past and current applications were presented to the audience as well.

At the end of his talk, Dr. Murrell answered many questions, and was presented with a gift to express the section's appreciation. The meeting was adjourned at 9:30 PM.

Respectfully Submitted,
Tara S. Baney, Chair, LVACS
29-May-05

Undergraduate Research Poster Session

The following posters were presented at the Undergraduate Research Poster session at the April meeting held at Moravian College on April 27, 2005

1.SYNTHESIS OF A FURANYL VITAMIN D_3 ANALOG
Gözde Ulas and William H. Miles, Department of Chemistry, Lafayette College

2.USEFUL CYCLOALKYLAMINE PHARMACOPHORES
Jonathan Havel, James Solomon, Christophe Guillon, and Ned Heindel. Lehigh University

3.3-R-7-(PHENYLMETHYLENE)-S-TRIAZOLO[3,4-B][1,3,4]-THIADIAZINES AS ANTICANCER AGENTS
Hasnain A. Malik[1], Ned Heindel[1], Christophe Guillon[1], Lakeisha O'Keiffe[1], Peter DeMatteo[1], and Jeffrey Laskin[2]
(1) Department of Chemistry, Lehigh University

⋆4.MECHANISTIC MODEL FOR NICOTINAMIDE COENZYME MEDIATED REDUCTION REACTIONS
Rachel Koralewski, Advisor: Daniel Libby; Moravian College

5.APPROACH TO THE SYNTHESIS OF RETIFEROL, A VITAMIN D ANALOG AND DIASTEREOSELECTIVE CONTROL IN NUCLEOPHILIC ADDITION TO 5-ALKOXY-4-OXOALK-2-ENOATES
Ryan Evans and Dr. William Miles, Lafayette College

6.SYNTHESIS OF SUBSTITUTED CHALCONES, NMR ANALYSIS OF THE ELECTRONIC SUBSTITUENT EFFECTS, AND CONJUGATED SYSTEM MODIFICATIONS
Laura Anderson and John Griswold, Department of Chemistry, Cedar Crest College

7.STRUCTURAL CHARACTERISTICS OF MOLECULES THAT AID IN THE DESIGN OF DRUGS
Veronica M. Kvarta and Assistant Professor Julie B. Ealy, Penn State Berks – Lehigh Valley College

8.DEVELOPMENT OF LABORATORY EXPERIMENTS FOR THE UNDERGRADUATE FORENSIC BIOCHEMISTRY LABORATORY
Nicole M. Beyer and Francis C. Mayville, Jr., Department of Natural Sciences, DeSales University

9.THERMODYNAMICS OF PHYCOCYANIN FOLDING AND OLIGOMERIZATION
Katie Thoren, Katelyn Connell*, Taylor Robinson, David Shellhamer, Hannah Tuson, Yvonne M. Gindt, Department of Chemistry, Lafayette College

10.THERMODYNAMIC STUDIES OF THE OLIGERMERIZATION OF PHYCOCYANIN
David Shellhamer, Taylor Robinson, Katie Thoren, and Y.M. Gindt, Department of Chemistry, Lafayette College

11.THE INTERACTION OF SODIUM SELENITE AND ORGANOSELENIUMS WITH TUBULIN
Stephanie Volk and Dr. Marianne Staretz, Department of Chemistry, Cedar Crest College

12.INVESTIGATION OF POLYAMINE ANALOGS ON THE GROWTH OF MCF-7 BREAST CANCER CELL LINES
Christopher Higgins, Michelle Piel, Kristina Thornburg, Francis C. Mayville, Jr., and Peter Leonard, Department of Natural Sciences, DeSales University

13.CHARACTERIZATION OF LONG WAVELENGTH EMISSION FROM DNA PHOTOLYASE
Ingrid L. DeVries, Meghan Ramsey, Johannes P.M. Schelvis, Yvonne M. Gindt, Department of Chemistry, Lafayette College

14.INVESTIGATION OF THE EFFECT THAT DIFFERENT DRYING METHODS HAVE ON THE MECHANISM OF THEOPHYLLINE RELEASE FROM MICROCRYSTALLINE CELLULOSE BEADS
Patricia Cruz, Kristin Kurek and Francis C. Mayville, Jr., Department of Natural Sciences, DeSales University

15.NANOSCALE ELECTROCHEMICAL STUDIES OF SOLUTION- AND VAPOR-DEPOSITED ALKANETHIOL SELF-ASSEMBLED MONOLAYERS ON GOLD
William R. McNamara, Tina H. Huang, Department of Chemistry, Lafayette College

16.INVESTIGATION OF THE COLLIGATIVE PROPERTIES OF TERT-BUTYL ALCOHOL WITH THE ADDITION OF SEVERAL SYNTHESIZED IONIC LIQUIDS
William Farina, Derick Seigel, Edward E. Fleming and Francis C. Mayville, Jr., Department of Natural Sciences, DeSales University

17.ELECTROCHEMICAL AFM AND STM INVESTIGATION OF MIXED POLYMERS OF POLYANILINE AND POLYSTYRENE SULFONATE ON GOLD
Matthew P. Coughlin, Tina H. Huang, Department of Chemistry

⋆ Winner of Student Travel Award

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This Month in Chemical History

by Harold Goldwhite, California State University, Los Angeles, hgoldwh@calstatela.edu
(Prepared for SCALACS, the Journal of the Southern California, Orange County, and San Gorgonio Sections of the American Chemical Society)

The year 1851 was a very significant one in Great Britain. Under the patronage of the Prince Consort, Prince Albert (Queen Victoria's spouse) and with his active involvement Britain staged the Great Exhibition, perhaps the first really international World's Fair. The main hall of the Exhibition was the so-called Crystal Palace, by far the largest glass and steel building erected to that date. It was designed by Joseph Paxton, who was more a gardener than an architect, and was assembled in Hyde Park in record time. And what, I can hear my impatient readers saying, has all this to do with chemical history? There were many exhibits relating to industrial chemistry in the Exhibition, and the front engraving in the 1851 edition of "The Year Book of Facts in Science and Art", by John Timbs, is of the Crystal Palace. My copy of this yearbook is bound in a handsome bright red cloth, in contrast to the sober grey-green of earlier and later editions I have. At first I thought this might have been to emphasize the special nature of the commemorated year, but there may be a more pedestrian explanation. My other volumes in this series are the original English editions, but the 1851 volume is the U.S. reprint.

Turning to the advances in Chemical Science covered in the Year Book in 1851 the first entry reports a demonstration by Lt. E.B.Hunt, U.S.Corps of Engineers, "that in any entirely homogeneous medium, the component parts of which act on each other by forces varying as any fraction of the distance, Mariotte's Law must prevail". Mariotte independently announced in 1676 the law connecting volume and pressure in gases that Robert Boyle had published in 1672. Shortly afterwards Newton had shown that such a law followed from a simple mechanical (and, incidentally, incorrect) model of gas corpuscles. Lt. Hunt's proof is apparently more persuasive than Newton's, but it is interesting that he credits Mariotte rather than Boyle for the origin of the law.

In an infuriatingly incomplete report "It is stated, apparently on good authority, that a French chemist, M. Chaudron-Junot, of Bussy, has succeeded in reducing to the metallic state, by exceedingly easy means, a great many bodies which have not hitherto been seen in that condition. He classes his substances in two series:- the first comprehending silicium, tantalum, titanium, chromium, tunster (sic), molybdenum, and uranium,-the second embraces magnesium, aluminum, and barium. "The properties of the metals of the first series are remarkable, since they completely resist oxidation and strong acids. "It is expected that these will replace platinum in many of its applications." Alas M. Chaudron-Junot's secret seems to have vanished with its author, and the "easy " availability of these metals would have to wait for a few decades – or longer.

There is a report of considerable interest, especially perhaps to those of us on the West Coast, on the gold of California by C. S. Lyman. "The Gold, the past season, has turned out much better than was expected. … On the middle fork of the Rio de los Americanos, two men recently dug 28,000 dollars in two months. I saw a portion of it in lumps of the size of hen's eggs, and larger….But for these few fortunate diggers, there are thousands who scarcely earn a

dollar a day…..Industrious workers have not averaged more than eight or ten dollars a day – some estimate it much lower." Despite such realistic appraisals of the prospects of riches, thousands rushed to California in those heady days just a couple of years after 1849 to seek their fortunes.

An interesting observation, reported by Mr. W. Petrie in the Proceedings of the British Association [for the Advancement of Science] in 1850 is on the phosphorescence of potassium, which is novel to me. Mr. Petrie concluded, from the consequences of the dynamical theory of heat, that potassium ought to be luminous, but only about one tenth as luminous as phosphorus (which owes its luminosity to oxidation). "On dividing a bit of potassium (which was quite dry, being protected only by a coating of bees' wax), the halves show two distinctly luminous sections; the light being about a tenth of that from a similar surface of phosphorus….The light diminished, naturally, as a protecting coating of oxide was formed, but remained just perceptible to the most sensitive sight, as long as half an hour.

Chemists were still trying to tame the oxidative powers of potassium chlorate and use it in controllable explosives. M. Augendre of Constantinople submitted a new gunpowder formulation including potassium chlorate, sugar, and potassium cyanide, to the French Academy of Sciences. As the article in "The Year Book" sagely remarks "but well knowing the dangerous character of all explosive compounds containing the chlorate of potash, we do not expect much benefit will accrue from its introduction." When potassium chlorate was newly discovered Lavoisier, who was leading the effort to improve French gunpowder, was overseeing the compounding of a batch of gunpowder in which potassium chlorate replaced potassium nitrate when it exploded prematurely. Lavoisier and his wife were fortunate enough to escape injury, but a number of workmen were not so lucky, and died in the explosion.

Meanwhile M. Sobrero was preparing pyroglycerin from the reaction between glycerine and a mixture of nitric and sulfuric acids in the same ratio as that used in making guncotton. "The product is liquid, and explodes very violently; its taste (!) is very distinctly bitter, and is a very active poison; two or three centigrammes immediately kill a dog." Nitroglycerin was tamed as dynamite by Alfred Nobel forty years later. It is also still in medical use as a heart stimulant.

Organic chemistry was still struggling to characterize compounds and establish relationships in those days before there was any agreement on atomic masses and any idea of structure was still in the future. M. Baup reports that doubts exist about the identities of several reported compounds, namely pyrogenous, citridic, aconitic, and maleic acids, all obtained from plants. M. Baup, after a careful examination of their properties and reactions, concluded that pyrogenous, citridic, and aconitic acids were identical, and that they should all be called aconitic acid. He also concluded that (in modern parlance) aconitic acid contained three acidic sites, and prepared the mono-potassium and mono-ammonium salts of the acid. However his conclusion that maleic acid was an isomer of aconitic acid was off the mark. Maleic acid has only four carbon atoms to aconitic's six.

Several new relatively large scale preparations of chloroform are reported. They all involve reactions among bleaching powder, water, and ethanol, though in different proportions and under different conditions. For example reaction among 5 kg of bleaching powder, 9 kg. of water, and 1.2 kg of 85% ethanol (Carl's Process) gave 285 g of chloroform. This period was early in the development and use of anesthesia in medicine; hence the interest in chloroform which was overtaking ether as the anesthetic of choice in surgery and childbirth.

M. Schonbein, the discoverer of ozone by the action of electric discharges on oxygen, reported on its properties. "Ozone acts powerfully on most metals, causing them to assume their maximum of oxidizement ….. It combines directly with olefiant gas [ethylene] without decomposition…" Schonbein also devised a sensitive test for ozone: "…a strip of starched paper containing a very small quantity of iodide of potassium." Starch-iodide paper is still a useful qualitative test for oxidants. The composition of ozone has, to 1851, defied analysis. M. Marignac "considers [ozone] as a peculiar modification of oxygen, which increases its chemical affinities. M. Schonbein regards it as a compound, probably containing more oxygen than oxygenated water [hydrogen peroxide]. But these are merely hypotheses…"

I conclude with another "discovery" that has not stood the test of time. Without further comment: "M. Cardan has described to the Paris Academy of Sciences, a new system of Filter, intended to render sea-water drinkable. This apparatus consists of a syphon, the long tube of which is filled with powdered charcoal. The author states that the sea-water, after having traversed this syphon, has lost its nauseous savour, and that the saline taste which remains is scarcely to be detected after it is mixed with wine [!]. MM. Becquerel and Pouillet are appointed commissioners to examine into the merits of this communication." The Becquerel mentioned was the father of the discoverer of radioactivity

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