

# THE NUCLEUS

February 2009

Vol. LXXXVII, No. 6

## Monthly Meeting

*Professor Wilton L. Virgo of Wellesley College to Speak at Simmons College*

## Tips for Job Seekers

*By Megan Driscoll*

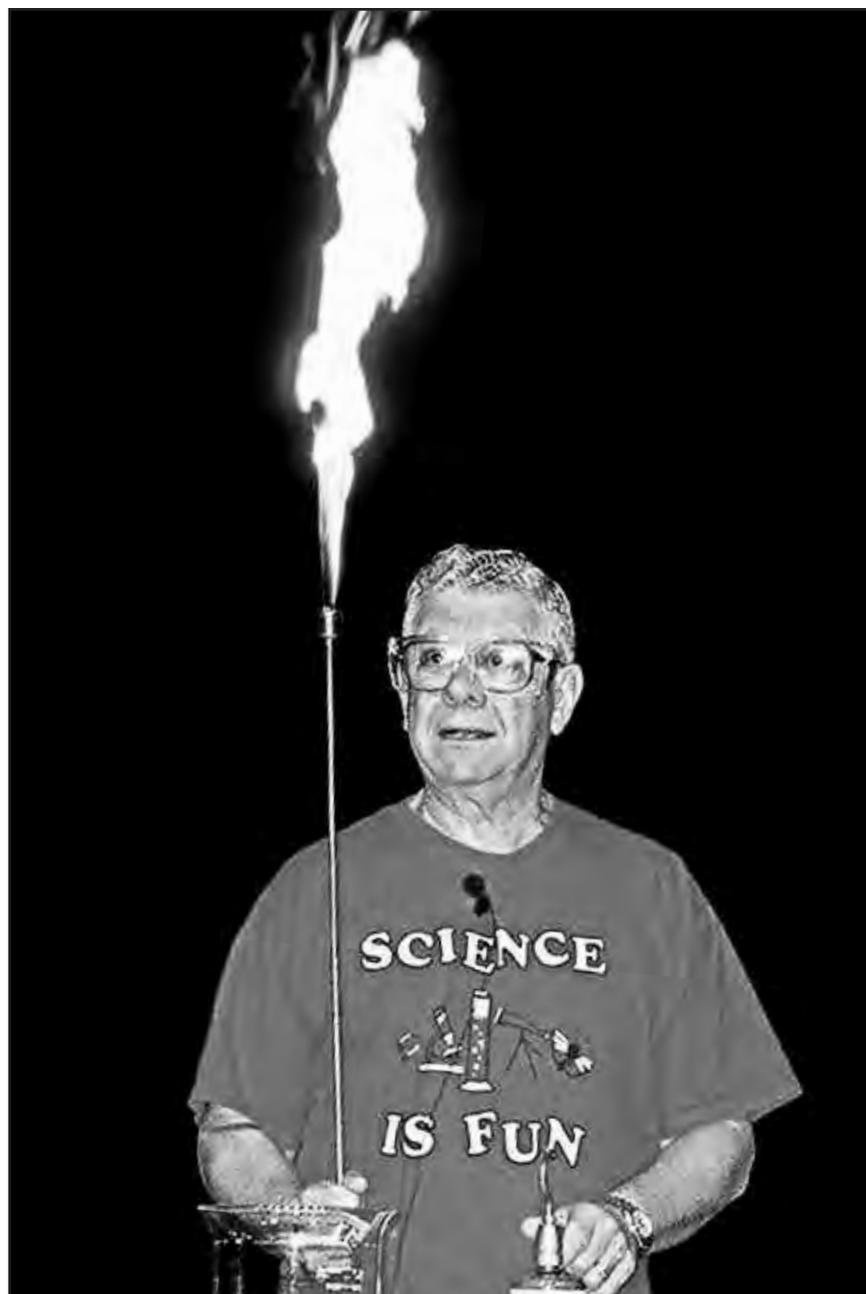
## Summer Scholar Report

*Identification of Genes Regulated by Transcriptional Regulator, p8*

*By Derek Kong*

## This Month in Chemical History

*By Harold Goldwhite, California State University, Los Angeles*



# February Historical Events in Chemistry

by Leopold May, The Catholic University of America, Washington, DC

## February 1, 1905

Fifty years ago, Emilio Segré shared the Nobel Prize in Physics (1959) with Owen Chamberlain for their discovery of the antiproton. He co-discovered technetium with C. Perrier in 1937, and astatine with D. R. Corson and R. MacKenzie in 1940, and demonstrated the existence of the antiproton in 1955. He was born on this date.

## February 2, 1802

Jean Baptiste Boussingault, who demonstrated that plants absorb nitrogen from soil in the form of nitrates and not from air as previously believed, was born on this day.

## February 6, 1892

Seventy-five years ago, William P. Murphy shared the Nobel Prize in Physiology or Medicine (1934) with George R. Minot & George H. Whipple for their discoveries concerning liver therapy in cases of anemia. He was born on this date.

## February 7, 1834

One hundred and seventy-five years ago Dimitri I. Mendeleev was born. He discovered the Periodic Law (Table) at same time as Lothar Meyer, who published later.

## February 8, 1795

One hundred and seventy-five years ago Friedlieb F. Runge discovered carboic acid (phenol) and aniline in coal tar. He also investigated dry distillation and the composition of matter and was born on this date.

## February 12, 1826

Moritz Traube, who was born on this date, did research in semi-permeable membranes, sugars, respiration, fermentation, oxidation, protoplasm, and muscle.

## February 14, 1917

Herbert A. Hauptman, who developed methods for the determination of crystal structures and received the Nobel Prize in 1985 with Jerome Karle for their outstanding achievements in the development of direct

methods for the determination of crystal structures, was born on this day.

## February 16, 1955

F. P. Bundy, H. T. Hall, H. M. Strong and R. H. O. Wentoff announced the synthesis of diamonds at General Electric Research Laboratories on this date.

## February 19, 1859

One hundred and fifty years ago, Svante A. Arrhenius was born. He devised a theory of electrolytic dissociation and was a researcher in viscosity and reaction rates. In 1903 he was awarded the Nobel Prize in Chemistry in recognition of the extraordinary services he had rendered to the advancement of chemistry by his electrolytic theory of dissociation.

## February 23, 1884

One hundred and twenty-five years ago Casimir Funk was born. He isolated nicotinic acid from rice polish-

ing and used it against pellagra and pursued the idea that diseases such as beriberi, scurvy, rickets and pellagra were caused by lack of vital substances in the diet.

## February 25, 1880

Arthur B. Lamb, who was the editor of the Journal of the American Chemical Society (1917-1949), was born on this day.

## February 28, 1901

Linus C. Pauling, who was born on this date, received the Nobel Prize for Chemistry in 1954 for his research into the nature of the chemical bond and its application to the elucidation of the structure of complex substances and the Nobel Peace Prize in 1962. He did research on the structure of molecules such as proteins and investigated the concepts of valency and resonance.

Additional historical events can be found at the CSW website or Dr. May's website, [faculty.cua.edu/may/history.htm](http://faculty.cua.edu/may/history.htm). ◇

**A good vacuum system  
needs a great vacuum trap:**

**Posi-Trap** positive flow  
vacuum inlet traps!

- No "blow-by" . . . *ever!*
- Filter elements matched to *your* application.
- *Easy* cleaning and changing.

**When you want the best, you want MV Products.**



**PRODUCTS**

*A Division of Mass-Vac, Inc.*

247 Rangeway Road • PO Box 359 • North Billerica, MA 01862  
978-667-2393 Fax 978-671-0014 sales@massvac.com www.massvac.com

**The Northeastern Section of the American Chemical Society, Inc.**

Office: Marilou Cashman, 23 Cottage St., Natick, MA 01360. 1-800-872-2054 (Voice or FAX) or 508-653-6329.

e-mail: mcash0953(at)aol.com

Any Section business may be conducted via the business office above.

NESACS Homepage:

<http://www.NESACS.org>

David Cunningham, Webmaster

ACS Hotline, Washington, D.C.:

1-800-227-5558

**Officers 2009**

*Chair:*

Dr. E. Joseph Billo

13 Shattuck Street

Natick, MA 01760

508-653-3074, joseph.billo(at)verizon.net

*Chair-Elect:*

John McKew

Wyeth Research

200 Cambridge Park Drive

Cambridge, MA 02140

*Immediate Past Chair:*

Marietta Schwartz

Chemistry Department, UMass-Boston

Boston, MA 02125

617-287-6146; marietta.schwartz(at)umb.edu

*Secretary:*

Michael Singer

Sigma-Aldrich

3 Strathmore Rd., Natick, MA 01360

508-651-8151X291; msinger(at)sial.com

*Treasurer:*

James Piper

19 Mill Rd., Harvard, MA 01451

978-456-3155, piper28(at)attglobal.net

*Auditor:*

Anthony Rosner

*Archivist:*

Myron S. Simon

20 Somerset Rd.

Newton, MA 02465; 617-332-5273

Romysimon(at)mindspring.com

*Trustees:*

Joseph A. Lima, Esther A. H. Hopkins,

Michael E. Strem

**Councilors**

**Alternate Councilors**

*Term Ends 12/31/2009*

Catherine Costello

Patricia Mabrouk

Michaeline F. Chen

Dorothy J. Phillips

Amy Tapper

Julia H. Miwa

Alfred Viola

Jerry P. Jasinski

Eva B. Binnun

Barney Grubbs

*Term Ends 12/31/2010*

Thomas R. Gilbert

Pamela Nagafuji

Robert Lichter

Michael Singer

Timothy B. Frigo

Mark Froimowitz

David Cunningham

Erik Rozners

*Term Ends 12/31/2011*

Doris I. Lewis

Mary Burgess

Morton Z. Hoffman

Michael P. Filosa

Kathi Brown

C. Jaworek-Lopes

Patrick M. Gordon

Lawrence Scott

Donald Rickter

Liming Shao

All Chairs of standing Committees, the editor of THE NUCLEUS, and the Trustees of Section Funds are members of the Board of Directors. Any Councilor of the American Chemical Society residing within the section area is an ex officio member of the Board of Directors.



# Contents

## February Historical Events in Chemistry \_\_\_\_\_ 2

by Leopold May, Catholic University of America

## Notable New England Chemists \_\_\_\_\_ 4

Eben Horsford, Wolcott Gibbs, Josiah Cooke, Jr. and Thomas Hunt

## Monthly Meeting \_\_\_\_\_ 5

Professor Wilton L. Virgo, Wellesley College, to Speak At Simmons College

## Announcements \_\_\_\_\_ 6

NSYCC Event-Overcoming Barriers in Careers in Chemistry and Chemical Sciences

## Call for Nominations \_\_\_\_\_ 6

James Flack Norris Award for Outstanding Achievement in the Teaching Of Chemistry, Philip L. Levins Memorial Prize

## This Month in Chemical History \_\_\_\_\_ 7

By Harold Goldwhite, California State University, Los Angeles

## Summer Scholar Report \_\_\_\_\_ 8

Identification of Genes Regulated by Transcriptional Regulator, p8

By Derek Kong, Sandro Goruppi and John Kyriakes, Molecular Cardiology Research Institute, Tufts University, Medford, MA

## Tips for Job Seekers in a Contracting Environment \_\_\_\_\_ 11

By Megan Driscoll, Pharmacologics Recruiting

## 2009 Chair's Statement \_\_\_\_\_ 11

Correction: E. Joseph Billo's Actual 2009 statement!

## Photos from National Chemistry Week \_\_\_\_\_ 12

By Morton Z. Hoffman

**Cover:** Professor Bassam Shkhashiri (University of Wisconsin-Madison), Phyllis A. Brauner Memorial Lecturer at the Boston Museum of Science during National Chemistry Week (Photo by Morton Z. Hoffman)

**Deadlines:** April 2009 Issue: February 13, 2009

May 2009 Issue: March 13, 2009

## THE NUCLEUS

The Nucleus is published monthly, except June and August by the Northeastern Section of the American Chemical Society, Inc. Forms close for advertising on the 1st of the month of the preceding issue. Text must be received by the editor six weeks before the date of issue.

**Editor:**

Michael P. Filosa, Ph.D., ZINK Imaging, Inc., 16 Crosby Drive, Building 4G, Bedford, MA 01730 Email: Michael.filosa(at)zink.com; Tel: 508-843-9070

**Associate Editors:**

Myron S. Simon, 20 Somerset Rd., W. Newton, MA 02465, Tel: 617-332-5273  
Sheila E Rodman, Konarka Technologies, Inc., 116 John St. Suite 12, Lowell, MA 01852 email: srodman(at)konarka.com tel 978-569-1414

**Assistant Editors:**

Stefan G. Koenig, Mindy Levine

**Board of Publications:**

David Cunningham (Chair), Mary Mahaney, Vivian K. Walworth

**Business Manager:**

Karen Piper, 19 Mill Rd., Harvard, MA 01451, Tel: 978-456-8622

**Advertising Manager:**

Vincent J. Gale, P.O. Box 1150, Marshfield, MA 02050, Tel: 781-837-0424

**Contributing Editors:**

Morton Hoffman, Feature Editor; Dennis Sardella, Book Reviews

**Calendar Coordinator:**

Sheila Rodman, email: srodman(at)konarka.com

**Photographers:**

Morton Z. Hoffman and James Phillips

**Proofreaders:**

Donald O. Rickter, Myron S. Simon, Vivian K. Walworth, E. Joseph Billo,

**Webmaster:**

David Cunningham, webmaster(at)nesacs.org

Copyright 2008, Northeastern Section of the American Chemical Society, Inc.

# Notable New England Chemists

From Myron S. Simon

Here we continue with the short biographies by Lyman C. Newell and Tenney L. Davis of Noted New England chemists of bygone days.

## **Eben Norton Horsford** 1818-1893

Eben Norton Horsford was born in Moscow, NY. He graduated from the Rensselaer Polytechnic Institute as a civil engineer in 1838. After working a year or so on the geological survey of New York, he was appointed (1840) Professor of Mathematics and Natural Sciences in the Albany, N.Y., Female Academy. Here he remained four years, also delivering annually a course of lectures on chemistry in a neighboring state.

In 1844 he went to Germany and spent two years in Liebig's laboratory at Giessen. On his return early in 1847 he was appointed Rumford Professor of the Application of Science to the Useful Arts in Harvard University. Stirred by his experiences in Liebig's laboratory, Horsford prepared a plan for a department of analytical and applied chemistry, which led to the establishment of the Lawrence Scientific School. The laboratory of the School was one of the first in which analytical chemistry was taught systematically to individual students. The work and workers exerted a profound influence on the development of chemistry in America.

In 1862 Horsford resigned to engage in industrial chemistry, a field which always fascinated him. Up to this time he had published over thirty original articles, starting with four in 1846 in Liebig's *Annalen*, and continuing with a dozen or so in Silliman's *American Journal of Science* and an equal number in the *Proceedings of the American Association for the Advancement of Science* and the *Memoirs of the*

*American Academy of Arts and Sciences*. He was deeply interested in the chemistry of foods, an interest shown by many articles, his book on "*Theory and Art of Breadmaking*" (1861), and the development of processes for manufacturing condensed milk and baking powder.

## **Wolcott Gibbs** 1822-1908

Wolcott Gibbs was the son of an enthusiastic mineralogist. He was born in New York City and received the Bachelor's degree from Columbia University in 1841. He then served for a time as an assistant to Robert Hare in Philadelphia. In 1845 he was awarded the degree of Doctor of Medicine by the College of Physicians and Surgeons in New York, but never engaged in the practice of medicine. He studied chemistry further with Rammelsburg in Berlin, with Heinrich Rose for a year, and with Liebig at Giessen for one semester. In Paris he attended the lectures of Laurent, Dumas and Regnault. He returned home in 1848, and in 1849 became Professor of Chemistry at the College of the City of New York, in which position he remained for fourteen years.

In 1863 he became Rumford Professor at Harvard University. Here he continued and expanded the work of Horsford, his predecessor, though for his main work he had charge of the laboratory of the Lawrence Scientific School, remaining for eight years until the laboratory was consolidated with that of the College. After that he maintained a private laboratory. He was one of the founders of the National Academy of Sciences and at one time its president. His first paper, published while he was a junior at Columbia, described, probably for the first time, a battery in which the inactive electrode was a plate of carbon. He is best known for his researches on the cobalt ammonia complex salts, on compounds of iridium and osmium, on the phospho-tungstates and phospho-molybdates, and on similar compounds of arsenic, antimony, tin, selenium, tellurium, vanadium, cerium, and uranium, and for the development of new

## **Corporate Patrons (\$2000+)**

Abbott Bioresearch  
Genzyme  
Lyophilization Service of New England  
Merck  
National ACS  
Novartis  
Pfizer  
Schering Corporation  
Sepracor  
Serono Reproductive Institute  
Vertex Pharmaceuticals  
Wyeth Pharmaceuticals

## **Patrons (\$1000-\$1999)**

Aptuit  
Astra-Zeneca R&D Boston  
Broad Institute  
Creagen Biosciences  
Estate of Wallace Gleekman  
Irix Pharmaceuticals  
Millennium Pharmaceuticals  
PCI Synthesis  
Shasun USA  
Sirtris Pharmaceuticals  
Strem Chemicals  
ZINK Imaging  
Ziopharm Oncology, Inc.

## **Donors (\$300-\$999)**

Cambridge-Major Laboratories  
Medicilon Inc  
Occidental  
Organix  
Peptech Corp  
Royal Society of Chemistry  
SAFC Pharma  
SAPA-NE

analytical methods and laboratory techniques.

## **Josiah Parsons Cooke, Jr.** 1827-1894

Josiah Parsons Cooke, Jr. was born in Boston, MA. When a mere lad his interest in chemistry was aroused by a course of lectures, illustrated by experiments, delivered by Benjamin Silliman at the Lowell Institute. He bought chemicals and performed many of the experiments in Turner's Chemistry. Entering Harvard College in 1844 he pursued the regular course and continued to study chemistry by himself.

While at Harvard he attended only a few, more or less, spectacular lec-

*continued on page 10*

# Monthly Meeting

*The 894<sup>th</sup> Meeting of the Northeastern Section of the American Chemical Society*

Thursday – February 12, 2009

## Simmons College

Paresky Center, Main Campus Building  
300 The Fenway, Boston, MA 02115

**4:30 pm** Board Meeting

**5:30 pm** Social Hour

**6:30 pm** Dinner

**7:45 pm** Evening Lecture, NESACS Chair, E. Joseph Billo, presiding

Speaker: Wilton L. Virgo, Diana Chapman Walsh Assistant Professor of Chemistry, Wellesley College. Title: *Tracking Energy in Chemical Dynamics from MIT to Wellesley: What are the Pathways for Electronic Energy Flow and Photochemistry?*

Dinner reservations should be made no later than noon, Thursday, February 5, 2009. Please call or fax Marilou Cashman at 800-872-2054 or e-mail at Mcash0953(at)aol.com. Please specify vegetarian. Reservations not cancelled at least 24 hours in advance must be paid. Members, \$30; Non-members, \$35; Retirees, \$18; Students, \$10.

### THE PUBLIC IS INVITED

**PUBLIC TRANSPORTATION:** Take MBTA green line E train (Heath Street) to Museum stop. Turn right onto Louis Prang Street. From here you can see Simmons' green cupola. Walk past the Isabella Stewart Gardner Museum on left. Simmons College, 300 The Fenway, will be on left.

Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so that suitable arrangements can be made. ◇

# Biography

Dr. Wilton L. Virgo earned his first degree in chemistry in 2000, completing the rigorous science curriculum at Princeton University. As a Princeton undergraduate, he was accepted into the Summer Scholars Institute, was chosen by the Department of Chemistry to be a tutor for the general chemistry course, selected for the Leadership Alliance Early Identification Program, and received a certificate for the Chemistry Outreach Program. For his senior thesis research, he constructed an infrared spectrometer designed for measurement of trace gases and detection of peptic ulcers.

As a Professional Associate at Brookhaven National Laboratory, Dr. Virgo built a tunable diode laser spectrometer for production and analysis of transient molecules that are important in combustion reactions. He then spent an exciting four years at Arizona State University. His graduate research at ASU involved investigating the response of diatomic chemical intermediates to electric and magnetic fields. His collaboration with Professor John Brown of Oxford University on the theory of molecules in external fields was in the best tradition of scientific

*continued on page 13*

# ABSTRACT

## *Tracking Energy in Chemical Dynamics from MIT to Wellesley: What are the Pathways for Electronic Energy Flow and Photochemistry ?*

One of the major goals in the field of physical chemistry is to elucidate the mechanism of energy flow during a chemical reaction. Since the 1960s there has been a great deal of scientific research focused on understanding the detailed mechanism of energy flow involving Inter-System Crossing by analyzing molecular spectra. However, there has never been sufficient information in traditional spectra to determine the important mechanistic details.

At MIT our research is focused on inventing new models to describe the mechanism of intramolecular chemical energy flow in highly energized, profoundly distorted forms of organic molecules. Our work provides strong support for a new deterministic doorway mechanism for chemical energy flow in molecules, rather than the more traditional, purely statistical decay mechanism. Using a simple experimental method to observe the time-evolution of a spectrum, we can obtain all the necessary information in order to use a deconvolution procedure that extracts the energy of the doorway state and relevant coupling matrix elements that describe the decay mechanism.

At Wellesley College the main research problem to be addressed is how photochemical energy is partitioned and transformed as atmospheric

reactions proceed through multiple channels involving photodissociation. Photochemistry provides the driving force behind the chemical reactions that mediate the production and removal of ozone in the atmosphere. We are designing and building a velocity map imaging apparatus in order to elucidate the major photochemical mechanisms and processes that initiate and drive atmospheric chemical reactions related to ozone production and removal. The experiment provides deep insight into the ways that energy is funneled through different photodissociation channels. The goal is to understand the fundamental chemistry of the key molecular protagonists that mediate atmospheric reactions. With the fundamental understanding of atmospheric chemistry derived from

*continued on page 12*

# NSYCC Event

*Overcoming Barriers in  
Careers in Chemistry and  
Chemical Sciences*

**5:00-6:30 pm**

**February 27, 2009**

**Location TBA**

Hosted by the Northeastern Section Younger Chemist's Committee (NSYCC)

The NSYCC ([www.nsycc.org](http://www.nsycc.org)) would like to announce that registration is under way for our upcoming panel discussion entitled, "Overcoming Barriers in Careers in Chemistry and Chemical Sciences." The discussion will be held February 27th from 5 pm to 6:30 pm at the a location to be announced. Dan Eustace, moderator of the discussion, encourages all interested chemists to register with NSYCC Publicity Chair Kathryn Bewley ([kathryn.bewley\(at\)nsycc.org](mailto:kathryn.bewley(at)nsycc.org)). Get directions and the latest details at [www.nesacs.org](http://www.nesacs.org) or [www.nsycc.org](http://www.nsycc.org)

The meeting will serve as a forum for younger chemists to ask questions and receive advice on meeting challenges on the path toward a successful career in chemistry. Questions can be submitted anonymously (3x5 card) or the panelists can be queried directly during the event.

**Members of the panel will include:**

- **Professor Wilton Virgo**, Assistant Professor of Chemistry, Wellesley College
- **Professor Valerie Petit Wilson**, Executive Director, Leadership Alliance and Clinical Professor of Community Health, Brown University
- **Dr. Dorothy Phillips**, VP and Director of Strategic Marketing, Waters Corporation

**Refreshments will be served. Space is limited, so register now!** ◇

# Call for Nominations

*The 2009 James Flack Norris  
Award for Outstanding  
Achievement in the Teaching of  
Chemistry*

**Deadline: April 15, 2009**

Nominations are invited for the 2009 James Flack Norris Award, which consists of a certificate and an honorarium of \$3,000, and is given annually by the Northeastern Section (NESACS). The presentation will take place at a ceremony and dinner in November 2009, and will include a formal address by the awardee. The Award was established in 1950 by NESACS to honor the memory of James Flack Norris (1871-1940), a professor of chemistry at Simmons College and M.I.T., chair of NESACS in 1904, and ACS President in 1925-26.

Nominees should have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. With the presentation of the first Award in 1951, awardees have included many eminent teachers at all levels whose efforts have had a wide-ranging effect on chemical education. The recipient will be selected from an international list of nominees who have served with special distinction as teachers of chemistry with significant achievements.

A nomination in the form of a letter should focus on the candidate's contributions to and effectiveness in teaching chemistry. The nominee's curriculum vitae should be included and, where appropriate, a list of honors, awards, and publications related to chemical education. Seconding letters may also be included; these should show the impact of the nominee's teaching for inspiring colleagues and students toward an active life in the chemical sciences and attest to the influence of the nominee's other activities in chemical education, such as textbooks, journal articles, or other

# Call for Nominations

*Philip L. Levins Memorial Prize*

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the Administrative Secretary of NESACS, 23 Cottage St., Natick, MA 01760 by **March 1, 2009**.

The graduate student's research should be in the area of organic analytical chemistry and may include other areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity, and three references must be included. The nomination should be specific concerning the contribution the student has made to the research and publications (if any) with multiple authors.

The award will be presented at the May 2009 Section Meeting. ◇

---

professional activity at the local, national, and international levels.

The nomination materials should consist of the primary nomination letter, supporting letters, and the candidate's curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty (30) pages, and should be submitted electronically in Adobe PDF format through **April 15, 2009** to Ms. Marilou Cashman, NESACS Administrative Secretary <[mcash0953\(at\)aol.com](mailto:mcash0953(at)aol.com)>.

For more information about the Award, see <[http://www.nesacs.org/awards\\_norris.html](http://www.nesacs.org/awards_norris.html)>.

Questions about the Award or the nomination process should be directed to the Chair of the Norris Award Committee, Prof. Morton Hoffman, Boston University <[Hoffman\(at\)bu.edu](mailto:Hoffman(at)bu.edu)>.. ◇

# This Month in Chemical History

Harold Goldwhite, California State University, Los Angeles  
hgoldwh@calstatela.edu

## Part I.

To quote verbatim from an earlier essay: “The idea of critically reviewing substantial areas of chemistry and producing a periodic report of progress originated with the great Swedish chemist of the early nineteenth century, Jons Jacob Berzelius (1779-1848). The original series of *Jahresberichte*, Berzelius’ brain child and the first of the Annual Reports, did not survive its originator. But there are other long-lived series of such reports.”

This essay will focus on Volume VI of the Annual Reports on the Progress of Chemistry issued by the Chemical Society (of London), which has now metamorphosed into the Royal Society of Chemistry. This ambitious attempt to encapsulate the total of the significant work in chemistry for a whole year covers 1909 in a mere 270 pages. It was, relatively, a peaceful year in world history; 5 years before World War I. Tensions were building in Europe but had not yet reached a boiling point.

Reviewing general and physical chemistry, T. M. Lowry, of Bronsted-Lowry fame, looks first at pressure effects on physical and chemical properties. R. Threlfall has found no conversion of graphite to diamond at pressures up to 10,000 atmospheres and “temperatures up to the melting point of magnesia” – about 3100K. A new form of ice (shades of Vonnegut?), Ice III, has been observed at 3000kg/square cm. P.W. Bridgman, the high-pressure guru, has described two new high-pressure gauges based on a direct measurement of gas volume and on the resistance of a mercury column. New precision has been achieved in measuring osmotic pressure, including investigations by the Earl of Berkeley and his colleagues; so much for the stereotype of the indolent nobility. Detailed studies of the thermal dissociation of calcium carbonate by Le Chatelier show marked deviations

among different experimental studies, perhaps attributable to different levels of adsorption of carbon dioxide by differently sized particles. E.C. Franklin has been studying conductivities of electrolyte solutions in liquid ammonia; he had done many pioneering studies of this remarkable solvent. Ostwald’s dilution law relating concentration and degree of ionization, has been investigated for a wide range of carboxylic acids.

In reviewing inorganic chemistry, H. B. Baker (whose work on intensive drying I wrote on some years ago in the Journal of Chemical Education) writes: “it is difficult to give a general idea of a year’s work” – presumably in the 22 pages or so allocated to him. He makes some interesting remarks which could well apply to work done a century later! “In an ideal chemical world, nothing would be published until a complete account of the subject of research could be presented. But apart

from the general question of publishing carefully worked out installments of a large research, the scramble for priority, happily not common in this country[!], is often responsible for the appearance of immature work.”

Sir William Ramsay has been unable to detect helium in the radioactive breakdown of thorium. There has been much discussion of Prout’s hypothesis, that all atomic masses should be integral on the scale of  $H = 1$ , but since 1909 was before the fuller understanding of isotopes the arguments descended into numerology rather than verifiable science. Meanwhile, new determinations of atomic weights have improved values for, among others, chlorine, nitrogen, and carbon.

Silane and disilane have been obtained as pure compounds, and various chlorosilanes probably containing chains of four and six silicon atoms

*continued on page 10*



## Eastern Scientific

301 Winter Street  
Hanover MA 02339

781-826-3456

## Vacuum Pump Problems?

Eastern Scientific  
specializes in the repair and  
precision rebuilding of all  
makes of mechanical  
vacuum pumps.

*Free pick-up & delivery  
Restrictions apply*



# Summer Scholar Report

## Identification of Genes Regulated by Transcriptional Regulator, p8

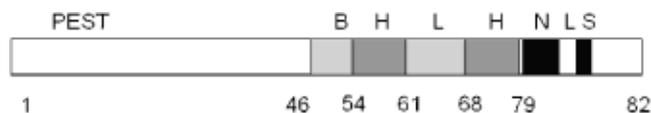
Derek Kong, Sandro Goruppi, John Kyriakis, Molecular Cardiology Research Institute, Tufts University, Medford, MA

### Background

Approximately five million people in the United States have heart failure. It is a disease that contributes to 300,000 deaths every year. Heart failure is a progressive disorder that is caused by the weakening of cardiovascular tissue due to stress, injury, or adverse reactions that other body systems have in response to heart impairment. Initially, the heart responds to harmful stimuli by attempting to compensate. This is known as a compensatory response. However, if the stressors are not relieved, cardiac hypertrophy occurs and a pathologic response results. Hypertension and ischemia are among the large number of stressors that cause hypertrophy, cardiomyocyte death, ventricular remodeling, and ventricular decomposition. These pathways ultimately lead to heart failure.

Whether the heart responds to stressors by a compensatory or pathologic response is determined by various cellular signal transduction pathways. Via these pathways, cells recruit proteins to specific segments of DNA for transcription. On such protein is p8, a small, high-turnover, stress-induced helix-loop-helix protein that acts as a transcriptional regulator in the nucleus and associates with cytoplasmic proteins.<sup>1</sup> p8 is required to activate compensatory heart responses, such as cardiac hypertrophy, when the heart is subjected to environmental stressors. After myocardial infarction, inflammatory cytokines, including TNF $\alpha$ , trigger the production of matrix metalloproteinase 9 (mmp9) in cardiac fibroblasts at the site of the infarct.<sup>1</sup> Secreted mmp9 digests and remodels the extracellular matrix to allow fibrous tissue to replace dead myocytes. We have previously shown that p8 is required for the induction of mmp9 by TNF $\alpha$ .<sup>2</sup>

Here we identify several novel genes as transcriptional targets of p8 and show that p8 is required for upregulation of transcription of these genes. In addition, we show that p8 activity is specific, and that it is not a general transcription factor for inflammatory genes in stress-induced pathways.



**Figure 1:** A scheme of the human p8 protein containing P: proline, E: glutamic acid, S: serine. T: threonine sequence contributing to short half-life and high turnover rate of p8. B: basic, H: helix, L: loop (bHLH) sequence. N: nuclear, L: localization, S: signal.

### Materials and Methods

Human tumor cells were infected with GFPp8, an unusually stable form of p8, so that the protein could be expressed at higher than normal levels. The cell cultures were expanded and the RNA was isolated. This RNA was applied to a HEEBO oligonucleotide array containing 48,958 70-mer oligonucleotide sequences, each corresponding to a

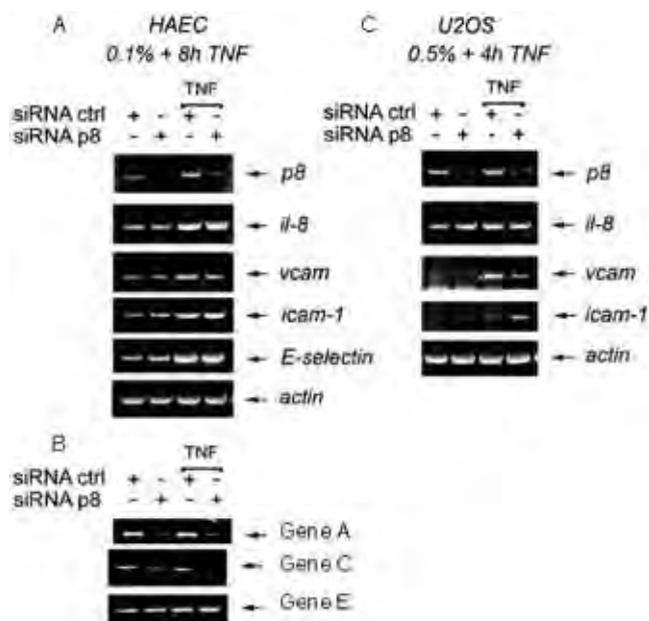
human gene coding for a protein. The array was screened for genes that were either upregulated or downregulated by the presence and absence of p8. A list of the 30 genes that were most affected by the presence of p8 was obtained and a thorough screening at the RNA level was performed.

RNA was purified using the method of phenol/chloroform extractions from several cell lines including U2OS (osteosarcoma) and HAE (human aortic endothelial) cells that had been previously treated with siRNA specific for the p8 mRNA (sip8) or a control siRNA (siCTRL). In addition, the cells were activated with +/- TNF $\alpha$ .

Reverse Transcription Polymerase Chain Reactions (RT-PCR) were used to analyze the regulation of specific genes by p8. Reverse transcription was performed for one hour, and the cDNA was amplified. PCR products were run on 1.8% agarose gels.

### Results

**RNA levels of genes treated with sip8** – The results of the oligonucleotide array indicated that a large number of genes are regulated by p8. Therefore, it was hypothesized that p8 may be a general transcription factor involved in



**Figure 2:** A) Human aortic endothelial cells treated with +/- sip8, +/- TNF $\alpha$  for 8 hours and serum starved. p8 silencing was confirmed using RT-PCR and p8 regulation of known inflammatory markers were checked. Actin levels shown to indicate consistent loading and successful RT-PCR reactions. B) RNA from human aortic endothelial cells was used to screen genes A, C, and E, which seemed to be regulated by p8 in other cell lines. C) Regulation of inflammatory genes by p8 checked in U2OS tumor cells that were serum starved prior to lysis.

stress pathways. Because TNF $\alpha$  is a major inflammatory cytokine and p8 is required for TNF $\alpha$ -mediated induction of mmp9, a screening of inflammatory markers was performed. The markers included E-selectin, Icam, Vcam, and Interleukin-8. RT-PCRs using RNA isolated from HAECs showed that TNF $\alpha$ -activated HAECs express an increased quantity of these genetic markers; however, the basal and activated levels of these genetic markers are unaffected by p8 presence in the cells. This finding was confirmed in both HAECs and U2OS cells.

We have shown that several novel genes are transcriptional targets of p8. Transcription of these genes is turned on when p8 is present in the cells, but turned off when p8 is silenced using RNAi specific for p8. Genes A, B, C, and E were most actively downregulated in the absence of p8 as shown in figure 2, panels C, D, and E.\* The RT-PCRs indicate that under several different conditions (serum starvation and absence of growth factors or in the presence of 10% fetal bovine serum) and in different cell lines (endothelial cells and tumor cells) the mRNA transcripts of these genes are consistently higher in the presence of p8 and lower after p8 is silenced.

Figure 3, panels D and E show the RT-PCR results of specific genes. Genes A, B, C, and E showed a positive cor-

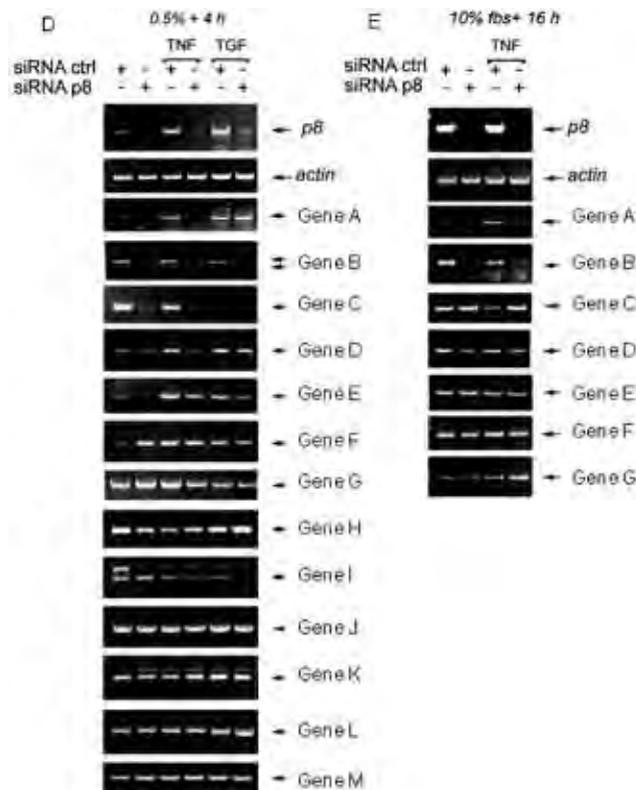


Figure 3: D) U2OS cells treated with +/- sip8, +/- TNF $\alpha$ , +/- TGF $\beta$ , and serum starved. p8 silencing was confirmed using RT-PCR and p8 regulation of specific genes were checked.  $\beta$ Actin levels shown to indicate consistent loading and successful RT-PCR reactions. E) U2OS cells treated with +/- sip8, +/- TNF $\alpha$ , and left in 10% fetal bovine serum.

relation between the presence of p8 and gene transcription. Genes D and F-M showed no visible regulation by p8.

## Discussion

This preliminary gene screening yielded significant results in expanding our knowledge of the genes and proteins that are affected by p8. Among the most interesting genes regulated by p8 were genes A and B. They code for proteins that have not yet been characterized in the cardiovascular system; however, these proteins may be interesting to study as downstream targets of p8 and may play a role in heart disease pathology. In this study, we have shown that the silencing of p8 almost completely shuts off production of mRNA transcripts that correspond to these genes. In addition, because we observed a transcriptional response within 4-8 hours, we infer that genes A, B, C, and E are most likely direct targets of p8 regulation. If these genes were further downstream, we would have expected a longer period of time between the time of p8 silencing and the time when gene A, B, C, or E mRNA was completely degraded.

Our lab has previously shown that p8 and TNF $\alpha$  directly interact during the process of ventricular remodeling that follows heart failure. Based on this study, however, we conclude that p8 does not play a role in other general inflammatory pathways in which TNF $\alpha$  and TGF $\beta$  are present in high quantities. Apparently, p8 acts only in the context of stress-related heart disease, not general inflammation. Additional data is required for a thorough understanding of this p8 specificity.

## Future Directions

We are currently studying one of the genes that we identified from the oligonucleotide array as being regulated by p8. Preliminary data indicates that gene A codes for a protein whose cellular presence is directly proportional to the presence p8, and is highly expressed in stem cells before differentiation. We are currently working in several different cell lines including human and mouse cardiac fibroblasts, human aortic endothelial cells, and human glioblastoma cells to confirm that a functional protein is indeed transcribed from the mRNA transcripts that were amplified in our RT-PCRs. One important aspect of our research is to determine whether gene A independently promotes the production of mmp9. If protein A is expressed in the cardiovascular system, it may have an important role in the progression of heart failure and heart disease. It is our goal to characterize these proteins and further our understanding of their specific activity in the cardiovascular system.

## Acknowledgements

Derek Kong was supported by the Norris/Richards Summer Research Grant and by the Molecular Cardiology Research Institute.

## References

- 1) Goruppi, S., Richard Patten, Thomas Force, John Kyriakis. 2006. HLH protein p8: a Transcriptional Regulator Required

*continued on page 10*

\* N.B. – Gene A is a transcription factor. Gene B is a growth factor. Genes C and E are protein kinases.

## Chemical History

Continued from page 7

have been characterized. Raschig has isolated chloramine for the first time, and the dangerous nitrogen trichloride has also been prepared in pure form. A new electrolytic ozonizer produces as much as 23% of ozone in oxygen. The disputed existence of sulfur dichloride has now been confirmed.

### Part II.

In continuing to review some significant developments in chemistry as reported in "Annual Reports of the Progress of Chemistry for 1909", published by The Chemical Society in 1910, I turn my attention first to the section on organic chemistry written by Cecil H. Desch and Arthur Lapworth. The latter was a significant pioneer in physical organic chemistry. To put the period in perspective (recall that Bohr's theory of the hydrogen atom is still in the future) let me quote: "The chemical importance of certain physical properties, notably colour and fluorescence, in their relation to structure, has been dealt with in several previous Annual Reports ... we are still far from possessing a complete theory of the phenomena. ... The formulation of ideas of structure in terms of the electron theory has so far made little progress in organic chemistry, the conception being still too indefinite for immediate application to so complex a problem."

A later paragraph goes on to say: "The influence of unsaturated or double linkings on the properties of a compound ... and the nature of so-called "partial valencies" are questions which recur..." We tend to think of Alfred Werner in connection with his insightful investigations into coordination compounds, but he came to that area via chemical and stereochemical studies of oximes with Hantzsch, and the 1909 Report goes into considerable detail on Werner's ideas on how "elements of decidedly electropositive or negative character" will exert their polar character on reactions of unsaturated compounds containing them in

continued on page 12

## Notable NE Chemists

Continued from page 4

tures given by Professor John W. Webster at the Medical School. He "picked up" some chemistry in Europe during a year's study, and entered upon his life work in 1849 - "a self-made chemist," as he often said. In 1850 Cooke was elected Erving Professor of Chemistry and Mineralogy. Within a decade he pushed chemistry into Harvard College, built up several courses, raised money for a chemistry building (Boylston Hall), and supervised its erection and equipment. Moreover, he interested students in a subject new to Harvard, secured the academic respect of his classical colleagues, and won the confidence of the university administration. As soon as Boylston Hall was completed, the little private laboratory where a few choice students were taught was replaced by commodious quarters and research begun.

Cooke's original papers on chemical topics number about seventy, the noteworthy ones being devoted to atomic weights. His books, especially "*Principles of Chemical Philosophy*" (1868) and "*The New Chemistry*" (1874), exerted a profound influence on the progress of chemistry.

### Thomas Sterry Hunt 1826-1892

Thomas Sterry Hunt was born in Norwich, Conn. He attended Yale College and studied chemistry under Benjamin Silliman. Being broad-minded, he chose several fields of labor and throughout his life excelled in two, chemical geology and chemical theory. In 1847 he was appointed chemist and mineralogist of the Geological Survey of Canada. During the twenty-five years he held this joint position he made many long reports of fundamental importance. Within the same period, particularly about 1850, he expounded by lectures and papers the views of

## Summer Scholar

Continued from page 9

- for Cardiomyocyte Hypertrophy and Cardiac Fibroblast MMP Induction. *Mol. Cell. Biol.* 10.1128/MCB. 00996-06.
- 2) Goruppi, S., and John Kyriakis. 2004. The Pro-hypertrophic Basic Helix-Loop-Helix Protein p8 is Degraded by the Ubiquitin/Proteasome System in a Protein Kinase B/Akt- and Glycogen Synthase Kinase-3-dependent Manner, whereas Endothelin Induction of p8 mRNA and Renal Mesangial Cell Hypertrophy Require NFAT4. *J. Biol. Chem.* 279, 20 20950-20958. ◇

Laurent and Gerhardt on atoms and molecules, and between 1850 and 1860 he presented his own views on theoretical chemistry — especially the water type. In the latter field he anticipated the views of such noted chemists as Williamson and Wurtz. Indeed, Hunt was usually on the skirmish line. For example, he anticipated Schonbein in the interpretation of the origin of nitrites and nitrates in nature, and Dumas in researches on the equivalent volumes of liquids and solids. Again in his "*Introduction to Organic Chemistry*," published in 1852 (with Silliman's "*First Principles of Chemistry*") he was one of the first chemists — perhaps the first American chemist — to define organic chemistry as "the chemistry of carbon and its compounds."

In 1872 Hunt was appointed Professor of Geology in the Massachusetts Institute of Technology, resigning, however, in 1878 to devote his entire time to expert work and literary pursuits. Hunt published about one hundred and sixty articles — chiefly in the *American Journal of Science*. His best known books are "*Chemical and Geological Essays*" (1874) and "*A New Basis for Chemistry*" (1887), later translated into French and Russian. He was president of the American Chemical Society in 1880 and 1888. ◇

### The NESACS website

Updated frequently · Late-breaking news · position postings  
Back issues of the Nucleus archived · Career-related Links · Awards and Scholarships

**WWW.NESACS.ORG**

# Tips for Job Seekers in a Contracting Environment

Megan Driscoll, President, Pharma-Logics Recruiting,  
[www.pharmalogicsrecruiting.com](http://www.pharmalogicsrecruiting.com)

In these uncertain times, it is very easy to get worried about your future. Maybe you have lost your job already, or you are facing an upcoming layoff at your company. Even if you are still happily employed, the economic downturn is enough to make anyone a little nervous. However, it is not a time to panic. Thankfully, Bio-Pharma is usually the last industry to be affected by a recession and the first to recover from it. Our firm is actually quite busy with new positions coming into our office every day, so don't lose hope. For candidates who are looking, it is important to remember a few specific things:

- Make sure you have a great resumé to present. Share it with peers for feedback to ensure it is as good as it can be.
- Research companies that have products similar to the ones you have worked on in the past, and approach them with your qualifications.
- Re-invent yourself. Be looking for positions that would be slightly outside your current scope of experience and think of creative ways to present your background to them.
- Be patient, your job search is going to take longer. Three months would be the average last year, but it could take up to six months this year.
- Use your network. Be assertive in contacting and presenting your qualifications to current and former colleagues. No one can sell *you* like *you*, so don't hesitate to pick up the phone.
- Contact recruiters you trust to let them know of your background and

# Correction: Message from the Chair - 2009

*Note from editor: In a mix-up in the January issue the statement of last year's chair, Marietta Schwartz, was substituted for the statement from this year's chair, Joe Billo. Here is Joe's statement.*

## Welcome to NESACS 2009!

During my term as chair of the section, I hope that I can make this the Year of Greater Membership Involvement. I have three suggestions.

First, I urge you to attend our monthly meetings. As well as enjoying a delicious meal and a stimulating talk, you will be able to mingle and network with chemists of all kinds, from students to Nobel laureates.

Second, I want to encourage you to become involved in the operations of the Northeastern Section. But first, let me tell you a little story. In January of 2008, as chair-elect of our section, I attended the ACS Leadership Institute for newly elected chairs of all 189 sections. There I had the opportunity to speak with chairs-elect of small sections, some with only 150 members. These chairs-elect were often struggling with the logistics of scheduling a monthly meeting or hoping to be able to put out an occasional newsletter. In contrast, our section, with over 6500 members, is a large, well-run operation. We have regular monthly meetings and the *Nucleus* is one of the best local section publications. Our sec-

---

interests for the future. Often, recruiters know about jobs before they even open up.

- Don't submit yourself to a position on line unless you absolutely have to. Use your network and the respected recruiters you know to get in first. In this economic environment, the databases are overflowing with resumes and it is hard for companies to filter through.

If you have additional questions about your job search, please e-mail Megan at: [mdriscoll\(at\)pharmalogicsrecruiting.com](mailto:mdriscoll(at)pharmalogicsrecruiting.com) ◇

tion's problem, as I see it, is that the same few dedicated people fill the elected and non-elected positions year after year. So I encourage you to look at the list of committee chairs that can be found elsewhere in this issue, and see if there is a committee that you would like to join. I know that the committee chairs listed there would all welcome additional volunteers; you can contact them via e-mail.

Third, I hope during 2009 to encourage the formation of some additional "interest groups" within NESACS. Currently we have a very active and successful Medicinal Chemistry group with a large membership. The MedChem group has a separate executive, a separate budget, and holds separate meetings, as well as providing speakers for some of our regular monthly meetings. I believe that other interest groups, such as a consultants group or retired chemists group, or an interest group focused on analytical chemistry, inorganic chemistry, education, or informatics, could be a valuable addition to our section. If you'd like to work with me to establish such a group, please contact me. ◇

## What's Yours?

DMPK Scientist,  
LC/MS Product Specialist,  
Mass Spec Operator,  
Staff Investigator,  
Process Chemist,  
QA Manager,  
Synthetic Chemist,  
Lab Instructor

Many local employers post positions  
on the NESACS job board.

Find yours at  
[www.nesacs.org/jobs](http://www.nesacs.org/jobs)

# National Chemistry Week 2008

(Photos by Mort Hoffman)



Professor Bassam Shkhashiri (University of Wisconsin-Madison) during the Phyllis A. Brauner Memorial Lecture



(L-R) Professor Shkhashiri, Susan Brauner, daughter of Phyllis Brauner, and Doris Lewis (Suffolk University), Chair of the Brauner Memorial Lecture Committee



A young chemist (Olivia F.) doing an NCW experiment.



Kyle G. at an NCW activity.

## Chemical History

Continued from page 10

contrast to the relatively non-polar carbon and hydrogen.

Perhaps reflecting Lapworth's interests, there is an extended section on "Mechanism of Chemical Change" of organic systems, including interpretation of the effects of acid catalysts in reactions of carbonyl compounds; kinetic studies of the rate of formation of urea from ammonium ions and cyanate ions (Woehler's famous synthesis); the Walden inversion; and isomeric changes such as the Hofmann and Beckmann reactions. The new catalytic reactions of Sabatier and Senderens include reductions with hydrogen over metal catalysts; and hydration, dehydration, oxidation, and elimination of hydrogen halide – versatile systems, indeed. E. Fischer's syntheses of polypeptides and of amino acids are reported.

A section on stereochemistry by H. O. Jones features prominently the first resolutions of organic compounds that have "enantiomorphism of the molecule without being assignable to a single asymmetric atom..." Perkin, Pope, and Wallach resolved 1-methylcyclohexylidene-4-acetic acid, and Mills and Miss Bain (!), 4-oximinocyclohexanecarboxylic acid. Each of these molecules is devoid of a plane of symmetry but contains no individual "asymmetric" atom. Optically active compounds with an "asymmetric" silicon atom have been resolved. Pasteur's biochemical method has been used to partially resolve benzaldehyde cyanohydrin; emulsin catalyses the hydrolysis of the *d*-enantiomer more rapidly than that of the *l*-enantiomer. In addition, a number of amino acids have been resolved by the action of yeast in the presence of sugar, including *d*-phenylalanine and *d*-serine. Further examples of optically active nitrogen compounds have been studied, including the quite simple *N*-methyl-*N*-ethylaniline oxide, resolved via its *d*-bromocamphorsulfonate salt.

I conclude with the report on radioactivity by none other than Frederick Soddy, Rutherford's collaborator,

## Abstract

Continued from page 5

these chemical dynamics experiments, one can begin to accurately model and predict the chemical response of the global atmosphere to both natural and anthropogenic perturbations. Since atmospheric chemistry is governed by the photodissociation of molecules by sunlight and the internal energy of vibrating molecules, the proposed experiment will yield deep insight into the chemistry of global climate change. ◇

coiner of the term isotope, and Nobel Laureate for chemistry in 1921. The report starts with a metaphorical bang. Alpha radiation has been conclusively proved to be doubly charged helium atoms. The emanation from 140 mg of radium was collected and its emission spectrum confirmed that helium was produced by radium decay. You'll recall that this work is prior to Rutherford's proposal of the nuclear atom, and the next reports foreshadow that work. Two methods: zinc sulfide scintillations, and the Geiger counter announced by Rutherford and Geiger, can count individual alpha particles. The ratio  $e/m$  for beta particles has experimentally been determined to decrease as the velocity of the particles (electrons) approaches that of light. The results are in complete accord with the Lorentz equation and this "experimental proof appears also to have important metaphysical [!] consequences in establishing the Lorentz-Einstein principle of relativity."

Gamma rays are still, in 1909, regarded as particulate, and the contemporary theory, known as the neutral-pair theory, holds that a gamma ray consists of an electrically neutral pair of a negative and a positive electron.

I cannot claim to have read carefully every word of Soddy's review, but I think I am correct in claiming that he never uses the word transmutation in describing radioactive change – an interesting reflection on the disrepute in which this alchemical term was held at that period. ◇

# BUSINESS DIRECTORY

## SERVICES



PCI Synthesis Inc. is a custom chemical manufacturer of new chemical entities (NCE's), and other specialty chemical products.

- Process Research
- Process Development
- Analytical Development
- Process Validation
- Regulatory Support
- FDA filing



**PCI Synthesis**  
9 Opportunity Way, Newburyport, MA 01950

**978.462.5555**  
[www.pcisynthesis.com](http://www.pcisynthesis.com)

## SERVICES

Nacal USA  
CORPORATION

**COSMOSIL HPLC Columns**  
- Since 1979

**New Phases Now Available!**

**HILIC (Triazole bonded)**  
- Unique stationary phase for highly polar compounds

**piNAP (Naphthylethyl group bonded)**  
- Enhanced  $\pi-\pi$  interactions for unsaturated compounds

**Cholester (Cholesteryl group bonded)**  
- New stationary phase for structural isomers



Nacal USA, Inc. 2640 Lusk Blvd. Suite A230 San Diego CA 92121  
Tel: 858-404-0403 Email: [info@nacalusa.com](mailto:info@nacalusa.com)  
[www.nacalusa.com](http://www.nacalusa.com)

## SERVICES



**PolyOrg, Inc.**  
Chemical Solutions for the Life Science Industry

- Custom Organic Synthesis
- Process Development
- Contract R & D
- Pharmaceutical Intermediates
- Medicinal Chemistry Support
- Biotechnology Specialty Reagents
- Solid Support Reactions
- Process Validation
- Gram to Multi-Kilogram Synthesis



**PolyOrg Inc.**  
10 Powers Street, Leominster, MA 01453  
Phone: 978-466-7978 1-866-Poly-002  
Fax: 978-466-8084 [info@polyorginc.com](mailto:info@polyorginc.com)  
[www.polyorginc.com](http://www.polyorginc.com)

## Biography

Continued from page 5

teamwork. At ASU Dr. Virgo was the recipient of numerous honors and awards, including being a More Graduate Education at Mountain States Alliance Scholar from 2002-2005, the Rao Prize for the most outstanding student talk at the 2002 Ohio State University International Symposium on Molecular Spectroscopy, the 2003 ASU Department of Chemistry and Biochemistry Outstanding Graduate Research Assistant Award, and the 2005 Eastman Kodak - Dr. Theophilus Sorrell Graduate Fellowship Award. His research at ASU resulted in eleven publications, two as first author, leading to the doctorate in chemistry. Dr. Virgo arrived at the Massachusetts Institute of Technology in January 2006 as a Postdoctoral Associate in Professor Robert Field's group in the Department of Chemistry. Later, he was honored to become a Postdoctoral Fellow and MLK Scholar. Dr. Virgo led a team of three graduate students

continued on page 16

[www.caslab.com](http://www.caslab.com)



Trusted technical expertise.

3860 S. Palo Verde Road, Suite 302  
Tucson, AZ 85714  
520.573.1061  
[tucsonlab@caslab.com](mailto:tucsonlab@caslab.com)

**Our Tucson Laboratory provides professional Micro-Elemental and Fuel Testing Services**

- CHNOS
- Carbon & Sulfur
- Halogens & Anions
- Metals - ICP-OES, ICP/MS, AAS
- Fuel Analysis
- Air Sensitive & Hygroscopic Samples
- Contact Columbia Analytical for a full list of capabilities.

Same day to 4-6 day rush services available.

**Columbia Analytical Services<sup>™</sup>**  
An Employee-Owned Company

THE FUTURE OF LIQUID CHROMATOGRAPHY IS ACQUITY UPLC



Waters ACQUITY UltraPerformance LC<sup>®</sup> (UPLC<sup>®</sup>) provides more information, increases laboratory throughput, and can enhance your lab's existing MS technologies.

Learn more about the UPLC advantage at: [www.waters.com/uplc](http://www.waters.com/uplc)

**Waters**  
THE SCIENCE OF WHAT'S POSSIBLE<sup>™</sup>

# BUSINESS DIRECTORY

## SERVICES

### Elemental Analysis

CHNOS ash  
ICP · AA · ICP/MS  
TOC · TOX · BTU  
Problem Solving

### HUFFMAN

LABORATORIES, INC.  
Quality Analytical Services Since 1936  
Phone (303) 278-4455  
FAX (303) 278-7012  
chemistry@huffmanlabs.com  
www.huffmanlabs.com



## Preclinic DMPK

LCMS, MSn, Mass analysis with  
ESI/APCI/Maldi-TOF/NanoSpray

[www.HT-LABS.com](http://www.HT-LABS.com)

[info@HT-Labs.com](mailto:info@HT-Labs.com) (858)677-9432

## LABORATORY EQUIPMENT

Bought • Sold • Exchanged

### FEBRUARY SPECIAL

Terra Universal Model 2148-02  
dehydration chamber with three  
independently controlled chambers

Call for Details

American Instrument Exchange, Inc.  
1023 Western Ave., Haverhill, MA 01832  
TEL: 978-521-2221 FAX: 978-521-8822  
[www.americaninstrument.com](http://www.americaninstrument.com)  
E-Mail: [info@americaninstrument.com](mailto:info@americaninstrument.com)

## Achieve Your Goals in Organic Chemistry

We deliver *On time, On cost,*  
and *On target.*

*For Excellence in Organic Chemistry*

Come to Organix Inc. for:

- *Contract research and development*
- *Custom synthesis (milligram to kilogram) in all areas of organic and medicinal chemistry*
- *<sup>1</sup>H NMR and <sup>13</sup>C NMR Spectra*
- *Structural Interpretation*
- *LC/MS Services*

**ORGANIX**  
Inc.

Phone: (781) 932.4142

Fax: (781) 933.6695

Email: [organix@organixinc.com](mailto:organix@organixinc.com)

[www.organixinc.com](http://www.organixinc.com)

## SERVICES

### Arendt & Assoc. IP Group Registered Patent Attorneys

- Global Patent Protection
- Licensing
- Controlling Patent Costs

(978)897-8400 or (978)807-5270  
111 at Interlakes 495, Southborough, MA

[jarendt@arendtpatentlaw.com](mailto:jarendt@arendtpatentlaw.com)

## TELL OUR ADVERTISERS

Membership surveys show that you want more articles in our newsletter. If you tell our advertisers that you saw their ad here, they will provide more financial support and this will allow us to add more articles.

## NMR Service 500MHz

\*Mass

\*Elemental Analysis

**NuMega Resonance Labs**

Tel: (858) 793-6057

## SERVICES



Scientific  
glassblowers  
serving  
New England  
for over 40 years

Solving your Pyrex or Quartz  
glassware needs from custom  
fabrication to repairs

[www.finkenbeiner.com](http://www.finkenbeiner.com)

### NMR - IR/FTIR - UV/VIS/FL Sampling supplies & accessories

See our full catalogs / current pricing at

[www.newera-spectro.com](http://www.newera-spectro.com)

CAGE Code: 44ME9

DUNS: 556785657



New Era Enterprises, Inc.  
1-800-821-4667  
[cs@newera-spectro.com](mailto:cs@newera-spectro.com)



## Micron Analytical Services

COMPLETE MATERIALS CHARACTERIZATION  
MORPHOLOGY CHEMISTRY STRUCTURE

SEM/EDXA • EPA/WDXA • XRD XRF • ESCA • AUGER • FTIR • DSC/TGA

Registered with FDA • DEA GMP/GLP Compliant

3815 Lancaster Pike Wilmington DE. 19805

E-Mail [micronanalytical@compuserve.com](mailto:micronanalytical@compuserve.com)

Voice 302-998-1184, Fax 302-998-1836

Web Page: [www.micronanalytical.com](http://www.micronanalytical.com)



## Robertson Microlit Laboratories

*Where speed and accuracy are elemental*

Elemental CHN, S, X, Analysis (same day service)

Metals by ICP-OES, ICP-MS, A/A

FTIR, UV/VIS Spectroscopy

Ion Chromatography

Bioavailability

Polarimetry

DSC melting point

KF Aquameiry, Titrimetry

P.O. Box 927 - 29 Samson Ave. - Madison, NJ 07940 - 973.966.6668 - F 973.966.0136

[www.robertson-microlit.com](http://www.robertson-microlit.com) • email: [results@robertson-microlit.com](mailto:results@robertson-microlit.com)

**Rapid Results • Quality • Accuracy • Competitive Pricing**

# BUSINESS DIRECTORY

## SERVICES

### Front Run OrganX, inc.

Custom Synthesis & Process Chemistry

#### WHEN QUALITY MATTERS

High Purity, Scalable Solutions  
to Challenging Organic Synthesis

Starting Materials to Pre-clinical  
Single to Multi-Step mg to Kg/m

**98% min. purity**

Phone 978-356-7133 Fax 978-356-7449

Email: [FrontRun@Spynet.com](mailto:FrontRun@Spynet.com)  
[www.FrontRunOrg.com](http://www.FrontRunOrg.com)

### LABORATORY EQUIPMENT

Bought • Sold • Exchanged

#### FEBRUARY SPECIAL

Terra Universal Model 2148-02  
dehydration chamber with three  
independently controlled chambers  
Call for Details

American Instrument Exchange, Inc.  
1023 Western Ave., Haverhill, MA 01832  
TEL: 978-521-2221 FAX: 978-521-8822  
[www.americaninstrument.com](http://www.americaninstrument.com)  
E-Mail: [info@americaninstrument.com](mailto:info@americaninstrument.com)

### COST-EFFECTIVE ANALYTICAL SERVICES

Our analytical laboratories offer same day or  
next day turn-around service. Our analytical  
department features a  
Waters Micromass Quattro  
Ultima Mass Spectrometer  
coupled with a Shimadzu  
LC-10AD VP liquid  
chromatography  
instrument for  
performing LC/MS  
analyses, and a Varian  
Inova 300 MHz NMR  
Instrument.



**YOUR FIRST SAMPLE IS FREE**

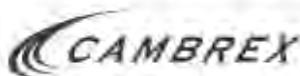
Call 781-938-1122 or email [raj@creagenbio.com](mailto:raj@creagenbio.com)  
to explore CreaGen's capabilities and expertise.



**CREAGEN** [www.creagenbio.com](http://www.creagenbio.com)  
BIOSCIENCES, INC.

## SERVICES

There's another option....



Innovation. Experience. Performance.

Providing quality API  
development &  
manufacturing services to  
the pharmaceutical  
industry for over 25 years.

Cambrex wants to help all greater  
Boston and Cambridge area  
companies. Give us a call to learn  
more about our technologies &  
service offerings.

**Phone: 617-515-0975**

e-mail: [nesales@cambrex.com](mailto:nesales@cambrex.com)  
<http://www.cambrex.com>

## CAREER SERVICES

### WOULD YOU BELIEVE?

- Our Section (NESACS) is the largest in the ACS.
- We have more volunteers than any other Section.
- We have more activities than any other Section.
- The Nucleus has been voted at several ACS National meetings to be the best Section newsletter.
- We are expanding Nucleus and NESACS web site coverage of activities.

The Following positions are open

1. Photo Journalists
2. Book Reviewers
3. Corporate and Local news reporters
4. Copy Editors
5. Volunteer Coordinator

If you would like to be active in this vibrant  
organization, please contact Board of  
Publications member Vivian Walworth  
[vwalworth@comcast.net](mailto:vwalworth@comcast.net)

No experience needed  
Just a willingness to participate  
and a sense of humor

### FREE RECRUITING WEB SITE LISTING

The Nucleus readership is Northern  
New England's largest source for  
chemical and biochemical personnel.  
The Nucleus reaches more than 7,000  
readers each month.

You can benefit from this large audience by  
using The Nucleus for recruiting chemists  
and biochemists:

- Companies for lab, management  
and sales personnel
- University & College teaching positions
- Hospitals for technical and  
research personnel

Our ACS publications are said to  
provide more **qualified resumes**  
than newspaper ads because of the  
highly targeted technical audience.

For further information and  
free web site listing visit:  
[www.mboservices.net](http://www.mboservices.net)

### Index of Advertisers

Am. Instrument Exchange .....	14
Arendt & Associates IP Group	14
Cambrex Corporation .....	15
Columbia Analytical Services	13
CreaGen Biosciences .....	15
Eastern Scientific Co. ....	7
G. Finkenbeiner, Inc. ....	14
Front Run OrganX, Inc. ....	15
HT Laboratories, Inc. ....	14
Huffman Laboratories, Inc. ....	14
Mass-Vac, Inc. ....	2
Micron Inc. ....	14
Nacalai USA, Inc. ....	13
New Era Enterprises, Inc. ....	14
NuMega Resonance Labs .....	14
Organix, Inc. ....	14
PCI Synthesis .....	13
PolyOrg Inc. ....	13
Robertson Microlit Labs. ....	14
Waters Corporation .....	13

## Biography

*Continued from page 13*

and two undergraduate researchers at MIT. Dr. Virgo's research at MIT has established a new class of molecular beam spectroscopy. The goal of his research is to characterize well known unsaturated organic molecules in profoundly distorted and highly excited forms using sophisticated laser techniques and detection on metal surfaces. The results of Dr. Virgo's research at MIT have been published in the Journal of Physical Chemistry. He has presented his MIT research at international symposia, including the 3rd US-African Advanced Institute in Cairo, Egypt 2008, the Gordon Conference for Electronic Spectroscopy and Dynamics in 2006 in Les Diablerets, Switzerland, The Ohio State University International Symposium on Molecular Spectroscopy 2006-2007, and the 234th American Chemical Society National Meeting in Boston 2007. Dr. Virgo's reputation and research at MIT have garnered invitations to give a Modern Optics and Spectroscopy Seminar at MIT, two seminars at Princeton University, a seminar at Wesleyan University, and three seminars at Wellesley College. Dr. Virgo has developed international collaborations with scientists in Switzerland, Japan, and Taiwan. In

# Calendar

**Check the NESACS Homepage for late additions:  
<http://www.NESACS.org>**

**Note also the Chemistry Department web pages for travel directions and updates.**

These include:

<http://chemserv.bc.edu/seminar.html>  
<http://www.bu.edu/chemistry/events/>  
<http://www.chem.brandeis.edu/colloquium.shtml>  
<http://www-chem.harvard.edu/events/>  
<http://web.mit.edu/chemistry/www.chem.neu.edu/web/calendar/index.html>  
<http://chem.tufts.edu/seminars.html> [CHEM.]  
<http://ase.tufts.edu/chemical/seminar.htm> [CHEM. ENGG.]  
<http://www.chem.umb.edu/>  
[www.umassd.edu/cas/chemistry/seminars.cfm](http://www.umassd.edu/cas/chemistry/seminars.cfm)  
[www.uml.edu/Dept/Chemistry/speakers.html](http://www.uml.edu/Dept/Chemistry/speakers.html)  
<http://www.unh.edu/chemistry/seminars.html>

### Feb 05

Bristol Myers Squibb Lectures  
Guy Lloyd-Jones (Univ. Bristol)  
TBA  
and Prashant Deshpande (Bristol Myers Squibb)  
TBA  
MIT 6-120  
4:00 pm  
Trevor Douglas (Univ. Montana)  
TBA  
Harvard, Pfizer Lecture Hall  
4:00 pm

### Feb 09

Prof. Timothy Swager (MIT)  
"Polymer Electronics for Ultra-Sensitive Chemical Sensors"  
Brandeis Univ, Gerstenzang 122  
3:45 pm  
Daniel Nocera (MIT)  
TBA  
Harvard, Pfizer Lecture Hall  
12:00 pm

### Feb. 10

Han Wang (UNH)  
"Explorations of Gold Complexes with Luminescence Properties"  
UNH, Iddles Auditorium, Room L103  
11:10 am  
Prof. Krishna Kumar (Tufts University)  
TBD  
Boston College, Merkert 130  
4:00 pm

### Feb 11

Etsuko Fujita (Brookhaven National Lab)  
"Photochemical CO2 Reduction: A Daunting Challenge"  
Harvard, Pfizer Lecture Hall  
4:00 pm

### Feb 12

Arieh Warshel (University of Southern California)  
TBA  
Harvard, Pfizer Lecture Hall  
4:00 pm

### Feb. 17

Bjorn Soderberg (West Virginia Univ.)  
UNH, Iddles Auditorium, Room L103  
11:10 am

### Feb 17-18

TY Shen Lecture  
Vern L. Schramm (Albert Einstein College of Medicine)  
Contact Betty Lou McClanahan  
[bl@media.mit.edu]  
MIT location TBA  
4:00 pm

### Feb 26

Gabor Somorjai (U. C., Berkeley)  
TBA  
Harvard, Pfizer Lecture Hall  
4:00 pm  
Gregory Tew (Univ. Massachusetts, Amherst)  
TBA  
UNH, Iddles Auditorium, Room L103  
11:10 am

### Feb 27

C. Dale Poulter (Univ. Utah)  
TBA  
MIT 6-120  
4:00 pm

### Notices for The Nucleus Calendar of Seminars should be sent to:

Sheila E Rodman  
Konarka Technologies, Inc.  
116 John St. Suite 12  
Lowell, MA 01852  
email: srodman(at)konarka.com ◇

July 2008 Dr. Virgo started his new faculty position as the Diana Chapman Walsh Assistant Professor of Chemistry at Wellesley College. He is currently building a new laboratory at Wellesley to study atmospheric photochemical dynamics using innovative laser techniques and creative molecular theory. ◇

**Looking for seminars  
in the Boston area?**  
Check out the  
**NESACS Calendar**  
[www.nesacs.org/seminars](http://www.nesacs.org/seminars)