

# THE NUCLEUS

January 1987

Of the Northeastern Section of the American Chemical Society

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## Monthly Meeting:

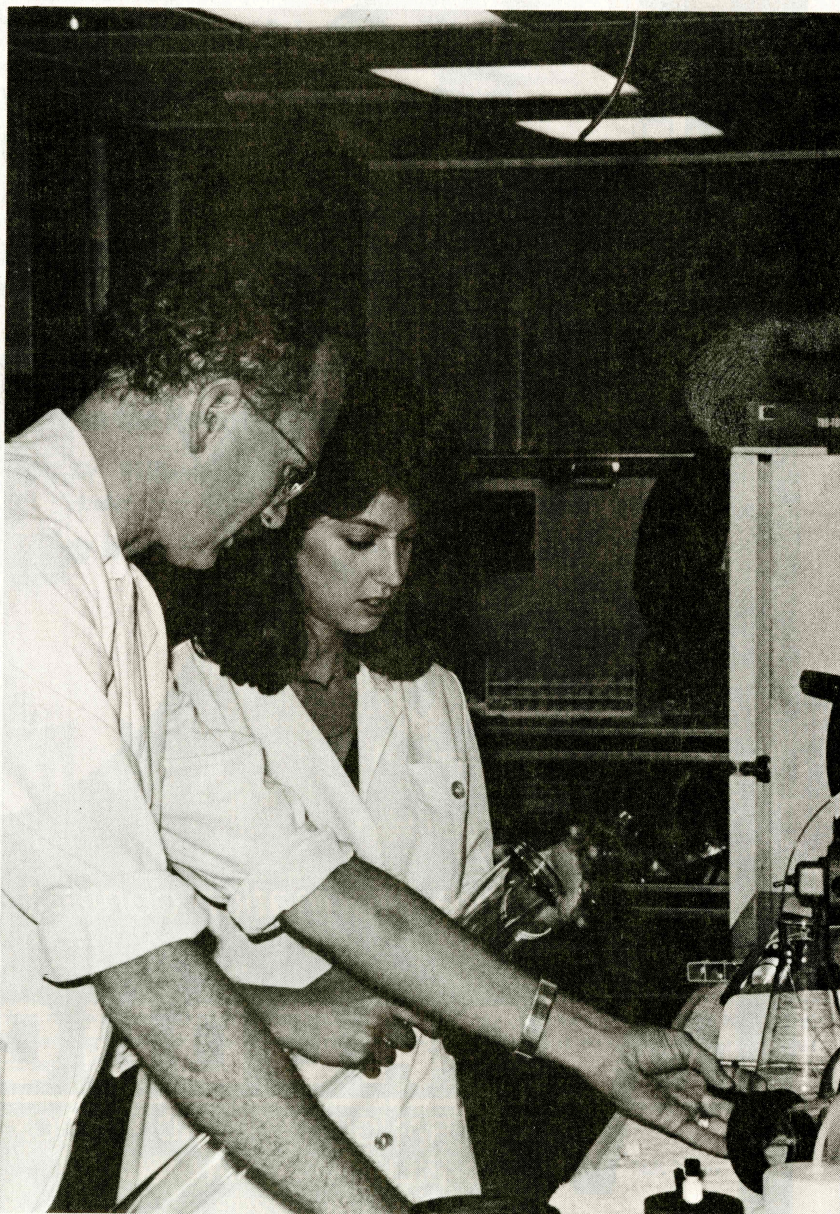
*Dr. Barry Karger to Speak on  
HPLC of Biopolymers*

## OTA Study of Advance Notice

## 1986 Norris Summer Scholar Reports I

## Book Review

*A History of ADL*

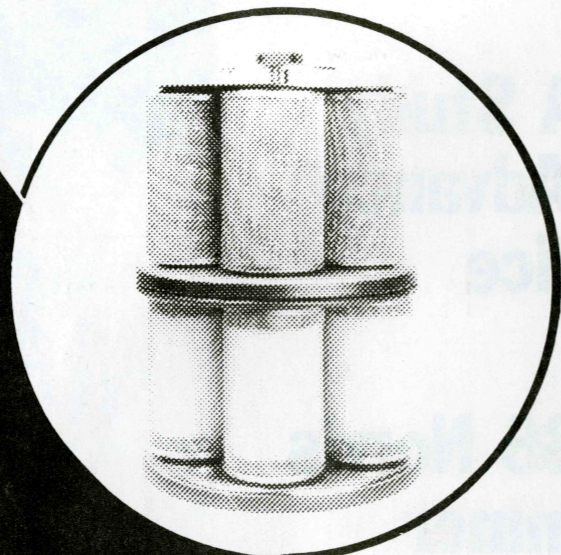


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**February Issue Deadline:** *December 20, 1986*

## THE NUCLEUS

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# OTA Study of Advance Notice

*Plant closing victims need more warning, better services*

Most American workers caught in plant closings or mass layoffs get little or no notice that their jobs are ending. Even when notice is given, effective help in finding or training for new jobs is usually not there when the workers need it most, according to the congressional Office of Technology Assessment (OTA). In a special report released on September 16, 1986, OTA found broad agreement that advance notice by employers is highly desirable, but intense disagreement on whether notice should be required by law.

Even in larger firms (over 100 employees) white collar workers receive only 2 weeks notice, on average, and blue collar workers get 7 days, according to preliminary results of a recent nationwide survey by the General Accounting Office (GAO), cited by OTA. Unions make a difference in the amount of notice workers get in plant closings and mass layoffs: where there is a

union, blue collar workers get an average of 14 days' notice; with no union, it is 2 days. Although most larger establishments report that they give some kind of notice to at least some of their employees, this may amount to only a general announcement of expected cutbacks, with no specific warning to individuals that their jobs will be lost. Thirty percent of larger establishments give no individual notice to blue collar workers, and another 34 percent give 2 weeks or less.

The amount of notice that most workers get is not enough for preparing an effective program of adjustment assistance, according to OTA. In some cases, a worthwhile emergency effort can be mounted in only a few weeks, but some important services will not be ready at the time of layoffs, when the demand for help peaks.

OTA found wide agreement among business, government, community, and

labor leaders on several key benefits of advance notice. It allows time to prepare services that help workers to find new jobs. It makes it easier to enlist the cooperation of management and labor in bringing services to workers, and to let affected workers know that help is available. It gives workers a chance to come to terms with job loss and think about their options. Advance notice can also benefit companies, by improving the morale of the workers who stay with the company, and by enhancing the company's reputation in the community.

Most employers, even those who voluntarily give advance notice, strongly oppose making it a legal requirement, says OTA. They believe that government requirements would be inflexible and intrusive, and the costs substantial. They argue that notice could lead to loss of customers and

*continued on page 8*

## Division of Professional Relations Seeks New Members

To be able to serve the interests of the chemists—for example, to be able to push for expansion of the employment rights of the chemical professionals in these days of massive restructuring and corporate takeovers—the Division of

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## January Meeting

*The 697th Meeting of the  
Northeastern Section of the  
American Chemical Society*

### Professor Barry L. Karger

James L. Waters Professor of  
Analytical Chemistry,  
Northeastern University



**Thursday, January 8, 1986**

Northeastern University, Huntington Avenue, Boston

**5:30 pm** Social Hour: Faculty Center, Kerr Hall, 96 The Fenway

**6:30** Dinner: Faculty Center

**8:00** Lecture: 97 Cargill Hall

**"High Performance Liquid Chromatography and Capillary  
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**Dinner Reservations:** No later than January 2, 1987. Please call Mrs. J. Fineman at 965-5245. Reservations not cancelled at least 24 hours in advance will be billed for dinner price. Members, \$13.00; Non-Members, \$15.00; Student and Retired Members, \$5.00. The public is invited.

## Biography

Barry L. Karger received his B.S. in chemistry from the Massachusetts Institute of Technology and his Ph.D. in analytical chemistry from Cornell University. He joined Northeastern University in 1963, where he is currently James L. Waters Professor of Analytical Chemistry. In 1973, Karger helped found the Institute of Chemical Analysis at Northeastern (since renamed the Barnett Institute of Chemical Analysis and Materials Science). He has served as director of the Institute since its inception. Among his honors, Karger has received the Dal Nogare Award of the Delaware Chromatography Forum; the ACS award in Chromatography in 1982, and the Tswett Chromatography Medal at the 23rd International Symposium on Advances in Chromatography in 1986.◇

## Abstract

**High Performance Liquid  
Chromatography and Capillary  
Electrophoresis in Biopolymer  
Separation and Purification**

Analysis and purification of peptides, proteins and oligonucleotides is of continual concern in the biological sciences. The focus of this talk will be on recent developments in HPLC and capillary electrophoresis. In HPLC, the relationship of protein structure to protein separation and performance will be explored. Secondly, the multiple use of individual columns (e.g. ion exchange and hydrophobic interaction) will be represented. In capillary electrophoresis, high speed SDS-PAGE for molecular weight analysis of proteins will be described. ◇

## Chairman's Message

*Lloyd D. Taylor*

A new year is now upon us and suddenly I am the Chairman of the Northeastern Section of the American Chemical Society. As I thought about various issues, I realized that two issues are great importance to me; therefore, I am going to try to increase activity from our section in these areas.

One of these issues is my concern for toxic waste and chemical pollution problems. Once again we have had a major chemical spill, this time in the Rhine River, causing large scale fish and plant devastation. Heavy publicity has resulted in great public concern to the general public about possible accidents in their work or home communities. I want to create a proactive committee which will serve as a resource center to give information to citizens and local government officials, including the Office of Environmental Affairs. Of course, we must first see if there are legal barriers to doing this and if insurance against law suits is necessary and not prohibitively expensive. I firmly believe that ACS has a public duty to provide information about the known properties of chemicals.

My second priority is making certain our section has a proactive Professional Relations Committee. This past year I have heard that some local firms have laid off substantial numbers of chemists. I would like our section to establish a resource center for these unemployed chemists. The circumstances of each layoff should be recorded and sent to the national office, and we should be in the position to offer assistance to the individual, especially in the area of benefits and new job counseling.

If any member has the time and wishes to get involved in either of these committees, please contact me at 577-3160. ◇

# 1986 Norris Summer Scholar Reports

## Computer Model for the Hepatic Biosynthesis of Xylulose Phosphates

by Norma J. Audet  
Faculty advisor:  
Dr. William L. Dills, Jr.  
Southeastern Massachusetts University

The main goal of this project was the preparation and use of a computer program to predict the rates of hepatic synthesis of the xylulose phosphates from xylitol. The key portion of this branched metabolic pathway is shown in Figure 1. This pathway is important in that the branch of the pathway involving xylulose-1-phosphate has been shown to give rise to glycolaldehyde, a metabolic precursor of oxalic acid (Barngrover and Dills, 1983; James *et al.*, 1985). As the use of xylitol as a food additive might therefore result in the synthesis of toxic oxalic acid, an understanding of the potentialities of this branch of the xylitol metabolic pathway is of the utmost importance. Direct measurements of flux through this branched pathway have been impaired by the low levels of flux and low steady state levels of the metabolic intermediates (Barngrover and Dills, 1983; Dills *et al.*, 1985). Accordingly we have undertaken the use of a computer model to predict the flux and steady state levels of metabolites. Kinetic equations and kinetic constants were available for two of the enzymes shown in Figure 1, these being xylitol dehydrogenase (e.g. Christensen, *et al.*, 1975; Hollmann, 1959) and fructokinase (Raushel and Cleland, 1977). Our project therefore included the purification and kinetic characterization of the third enzyme in Figure 1, xylulokinase, for which this work had not heretofore been reported. The remainder of this report consists of two parts; 1.) the purification and characterization of xylulokinase, and 2.) the description and use of the computer program.

The enzyme D-xylulokinase was purified from fresh beef liver. The purification procedure was based on that reported by Deegan (1981) with an additional ammonium sulfate fractionation and an additional chromatographic

separation using a hydroxyapatite column. The detailed procedure is outlined below. The buffer used for all of the steps unless otherwise indicated was 50mM Tris-HCl, pH 7.4, containing 0.5 mM EDTA and 5.0 mM 2-mercaptoethanol. Activity was monitored throughout the purification by coupled enzyme assay procedures described by Deegan (1981). Fresh beef liver (150 g) was homogenized in buffer and centrifuged at  $30,000 \times g$  for 30 min at  $4^\circ\text{C}$ . The resulting supernatant was then centrifuged at  $105,000 \times g$  for one hour at  $4^\circ\text{C}$ . This second supernatant was applied to a DEAE-cellulose column which was then eluted with a linear gradient of KCl ranging from 0.00M to 1.00M in buffer. The fractions containing xylulokinase were pooled and brought to 33% saturation with ammo-

nium sulfate. After centrifugation the resulting supernatant, which had greater than 95% of the enzyme activity was brought to 60% saturation with additional ammonium sulfate. The pellet resulting from the subsequent centrifugation contained the bulk of the activity and was redissolved in 5 mL of buffer. This sample was immediately chromatographed on a Sephadex G-100 column. The fractions containing enzyme were immediately applied to a Matrex Red A column for affinity chromatographic purification. The column was developed with a linear gradient of KCl ranging from 0.00M to 1.50M in buffer. Thus far the procedure has not differed from that originally reported by Deegan (1981). Xylulokinase preparations obtained in this manner were nearly homogeneous but usually contained one or more contaminating bands of protein when subjected to SDS polyacrylamide gel electrophoresis. Accordingly, an additional purification step was utilized. The enzyme was concentrated by the addition of solid ammonium sulfate to a concentration of 65% saturation followed by centrifuga-

tion. The pellet was redissolved in 5.0 mL of 1.0 mM phosphate buffer, pH 6.8 containing 5.0 mM 2-mercaptoethanol. The resulting solution was applied to a hydroxyapatite column which was developed with a linear gradient of 10 mM to 100 mM phosphate, pH 6.8, containing 5.0 mM 2-mercaptoethanol. Fractions containing enzyme were pooled and frozen at  $-90^\circ\text{C}$ . The latter procedures gave an overall yield of about 80% (19% from the crude extract) but did not cause a significant increase in specific activity. The enzyme so obtained was free from any major contaminants and was active towards both D-xylulose and D-ribulose. Kinetic parameters were determined as described for fructokinase by Raushel and Cleland (1977) and references therein. The kinetic equation is shown below:

$$v = V_{\max}[\text{ATP}][\text{xyu}] / \{K_{i_{\text{xyu}}}K_{\text{M}_{\text{ATP}}} + K_{\text{M}_{\text{ATP}}}[\text{xyu}] + K_{\text{M}_{\text{xyu}}}[\text{ATP}] + [\text{ATP}][\text{xyu}]\}$$

The kinetic constants obtained with the purified enzyme were  $K_{\text{M}_{\text{xyu}}}=0.14$  mM;  $K_{i_{\text{xyu}}}=0.67$  mM; and  $K_{\text{M}_{\text{ATP}}}=0.083$  mM.

The computer program was written in FORTRAN 77 and executed on a DEC 20 computer. For the purposes of the program the velocity of xylitol dehydrogenase was calculated from the sorbitol dehydrogenase equation reported by Christensen *et al.* (1975) with parameters for xylitol and xylulose calculated from the data of Hollmann (1959). The equation for both fructokinase and for xylulokinase was that of Raushel and Cleland (1977) with their data on xylulose for fructokinase and our own (see above) for xylulokinase. The maximal tissue velocities for the various enzymes were taken from literature values (Birnesser *et al.*, 1973; James *et al.*, 1985) as were the intracellular cofactor levels (Bergmeyer, 1974). For the purposes of our model it was assumed that no significant back reaction would occur with either of the kinases, but could occur with the dehydrogenase. The program used an iterative procedure to make succes-

sive approximations as to the steady-state level of xylulose and then calculated the net velocities of all three enzymes. We examined the effects of varying enzyme, cofactor and xylitol levels on the synthesis of both xylulose phosphates and on steady state levels of xylulose. In summary, almost all parameters tested except total combined concentrations of NADH and NAD (data not shown) had some significant effect on the production of xylulose-1-phosphate from xylitol. Even under the most favorable circumstances (high fructokinase levels), the predicted rate of xylulose-1-phosphate synthesis was never more than 70 nmol/min./g.wet wt., which is less than 10% of the total xylitol metabolized. Based on our results thus far it would also appear that the synthesis of both xylulose phosphates and their relative levels are most profoundly influenced by factors which would limit flux through the xylitol dehydrogenase step, notably NADH/NAD ratios. An in-

crease in the NADH/NAD ratio from 0.04 to 0.40 for example decreases the rate of xylulose-1-phosphate synthesis from 15.6 to 2.0 nmol/min/g wet wt of liver and its percentage of the overall xylulose phosphate synthetic rates from 1.21 to 0.86%. This is of great potential significance due to the possible relationship between xylitol consumption and oxalate formation from xylulose-1-phosphate. Further work will be needed to refine the program and to investigate its applicability to data for the human liver. For instance, some recent data on aldolase on the human liver (Bais *et al.*, 1985) will allow our model to be extended to include approximations of steady-state levels of xylulose-1-phosphate and possibly glycolaldehyde, metabolites for which information on rat liver levels has been published (Barngrover and Dills, 1983). The low steady state levels predicted for xylulose are in agreement with the reported low levels already reported in the literature (Barngrover and Dills, 1983).  $\diamond$

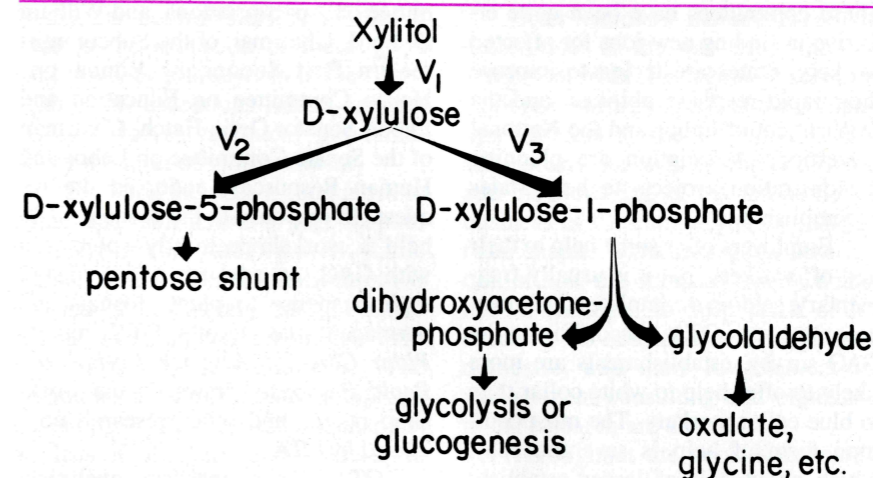


Figure 1. Reactions to be used to derive the program to be used for the predictions of flux through the pathways of xylitol metabolism.

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### Nominations for the Henry A. Hill Award

Nominations for the Henry A. Hill Award for Outstanding Service to the Northeastern Section should be sent to William O. Foye, Chairman, Awards Committee, at 179 Longwood Avenue, Boston 02115 by February 27. A brief resumé and description of the candidate's contributions to the Northeastern Section should be included.

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## ADVANCE NOTICE

Continued from page 4.

credit. Concern that advance notice requirements would be hardest on small businesses is widespread. Although small businesses could be exempted from the requirements, where to draw the line in defining small business is not clear.

Two common perceptions about advance notice do not appear to be true, OTA found. The idea that advance notice leads to lowered morale and production gets little support, either from businessmen or other people experienced in plant closings. Instead they report that productivity, quality, and safety records have all improved during the notice period. OTA also found that advance notice does not often help to keep plants open that would otherwise close. Sometimes, when conditions have been favorable, advance notice combined with community or government assistance has helped to avoid a closure. However, a few months notice is usually not enough time to turn an ailing business around.

Looking at the experience of three American forest products companies operating in Canada, OTA found that these firms had little trouble with advance notice requirements and customs in that country. The Canadian subsidiaries of these U.S.-based companies routinely provide 2 to 6 months' advance notice. The parent firms in the United States differ markedly, both from their Canadian subsidiaries and from each other. All three strongly oppose mandatory advance notice; one provides notice as a matter of company policy, and the other two do not favor it even as a voluntary company policy.

OTA found that, while many of the arguments against mandatory advance notice are credible, it is harder to find evidence of the costs than evidence of the benefits. Moreover, some of the costs may be confined to special cases, while the benefits apply more widely. Much of the benefit of advance notice

depends, however, on the ability to provide good services promptly to the affected workers. This ability is mostly lacking in the United States, says OTA.

The major government program providing adjustment assistance to displaced workers—Title III of the Job Training Partnership Act—is still new. States are responsible for implementing the program; OTA found that most have not yet developed the ability to respond rapidly and effectively to announcements of closings or layoffs. Delays of several months in funding projects to help the affected workers are common, and longest when Federal approval is needed in addition to State and local approval. Also, few States have enough trained staff to bring technical assistance quickly and effectively to plants laying off workers. None so far has a system comparable to the Canadian Industrial Adjustment Service, which can set up labor-management adjustment committees, quickly and inexpensively, in plants that are closing. These committees have been quite effective in finding new jobs for affected workers. States are trying to improve their rapid response abilities, and the Department of Labor and the National Governor's Association are planning demonstration projects to help States accomplish this.

Employers offer some help to their laid-off workers, but it is usually fragmentary, seldom a complete adjustment program, says OTA. According to the GAO survey, establishments are more likely to offer help to white collar than to blue collar workers. The most common form of help is severance pay, which about half of larger establishments offer to white collar workers. About one-third provide it to blue collar workers. One-third of these larger firms offer placement help to white collar workers; one-fifth offer it to blue collar workers. Most often, businesses that give placement assistance provide staff, space, and limited funding; few, even among larger establishments, take on the whole burden of adjustment assistance. Usually, technical and financial support from government is needed to mount a comprehensive reemployment and retraining effort.

Bills requiring advance notice have been introduced in Congress since 1973, but no law has been enacted. A few States and communities have advance notice laws on the books. Opinions on requiring advance notice are polarized and have changed little in the last dozen years, according to OTA. Business representatives oppose it, arguing that a good program of adjustment assistance is more important than advance notice per se. Labor representatives favor it, and argue that good adjustment programs are impossible without advance notice. The common ground in this debate is that rapid, effective responses should be developed, funded and emphasized. The ability to provide such responses should be routine.

OTA's special report was done at the request of Representatives William Clay, Chairman of the Subcommittee on Labor-Management Relations, House Committee on Education and Labor; Silvio O. Conte, Ranking Minority Member of the House Committee on Appropriations; and William D. Ford, Chairman of the Subcommittee on Post Secondary Education, House Committee on Education and Labor. Senator Orrin Hatch, Chairman of the Senate Committee on Labor and Human Resources, endorsed the request. In response to the request, OTA held a workshop, jointly sponsored with GAO, on advance notice of and rapid response to plant closings and permanent mass layoffs. OTA's report, *Plant Closing: Advance Notice and Rapid Response*, draws on the workshop results and other research conducted by OTA.

OTA is a nonpartisan analytical agency that served the U.S. Congress. Its purpose is to aid Congress in dealing with the complex and often highly technical issues that increasingly confront our society. Copies of the OTA Special Report *Plant Closing: Advance Notice and Rapid Response*, are available to the public at the U.S. Government Printing Office (GPO), Superintendent of Documents, Washington, D.C. 20402, (202) 783-3238. ♦

## Book Review

### *The Problem Solvers. A History of Arthur D. Little, Inc.*

By E.J. Kahn, Jr.  
Little Brown and Co., Boston, 1986.  
234 pp. 15×23 cm. \$19.95.

The publication of the book celebrates the 100th anniversary of the founding of the company on October 1, 1886. The author, who spent a year in residence at Acorn Park, Cambridge, while writing the book, has been a well-known contributor to the *New Yorker* magazine for 50 years. During that time he has written 24 books on a variety of subjects and has developed a style that some enjoy and some do not. As one critic puts it, "he employs the mild, slightly condescending humor which men with more important affairs display for the recondite, scholarly, or technical and scientific endeavor. There is marked attention to those assignments that bring ADL into contact with captains of industry, cabinet ministers, and heads of state to the exclusion of much good solid work by journeymen of the firm." With a few exceptions Kahn's account rarely involves technical personnel below the level of vice president.

The book includes a good index to names and subjects and 16 pages of photographs of the staff from Dr. Little himself to the 1986 administration. It consists of 12 chapters, each of which begins with a quotation from the writings of Dr. Little. (Example: "The laboratory is as much God's temple as the church.") The first and last chapters are lists of what employees were up to on October 1, 1984 and on October 1, 1985 respectively. They alone give the reader a real feel for the diversity of assignments now being carried out throughout the world. It is apparent that laboratory-based contract research for industrial and government clients no longer is a major activity at ADL; it is said to be only 25%.

The early chapters cover the history of the company in a rough chronological order up to the time of World War II after which strict chronology would become pedantic. Kahn does not hesitate to digress from early history to modern times. For example, his story

about Dr. Little's making of a silk purse from sows' ears has a modern counterpart in the recent floating of a lead balloon. He must have relied on company files for all information prior to the war, at the beginning of which the company had just 85 employees. There are very few of the 85 left who could provide first-hand information about the early years. It is unfortunate that Kahn does not cite the earlier historical efforts of John Voss and Irving Telling who wrote during the 1950s. Perhaps he never saw them. Modern observers of ADL might think that employee turnover and a rapidly growing alumni association were recent developments but Kahn describes similar events in the early days of the company, including the departure of Gustavus J. Esselen and Hervey Skinner to set up their competing businesses.

Later chapters include excellent descriptions of the war years, the development of the management services work (amounting to 40% of the company's business by the 1950's), the first and second comings of James Gavin, and the flowering of the international business of the company. The penultimate chapter contains a good description of how the company operates and how it manages to keep track of its finances. Its subsidiaries, foreign and domestic, and their involvement in management consulting and organizational research are all covered.

Throughout the book Kahn carefully avoids mention of super-secret work and of the more sordid aspects of internecine warfare, skullduggery and your garden variety of hanky panky. At ADL they have been, in essence, the same as those seen in most human endeavors such as corporations, academic institutions, and the church. There is a reasonable amount of hype. A report in a recent issue of *New England Business* tells us that ADL vetoed the publisher's design of the book's dustjacket as being too unexciting and unsophisticated. Jeffrey Dawson and Associates was hired to provide an alternative design that was silver with black and red let-

ters. Some of the words in the title were italicized and the sub-title, "A History of Arthur D. Little, Inc." was changed to read, "The Inside Story of Arthur D. Little, Inc."

In a short preface Kahn admits that he has had to omit reference to thousands of jobs done for clients over the years and to thousands of ADL alumni. One cannot cram all the interesting history of the last 100 years into a book of this size. He claims that the selection and use of material was his own exclusively, but these choices must have been made with some help from the ADL public relations department, an organization that has had its bad moments of late. Kahn mentions the unsuccessful attempt by the PR people to have the large letters ADL taken off the building along Route 2 because they might be mistaken for the Anti-Defamation League. He also tells how the PR retired the world-famous flying acorn logo because of an alleged sexual connotation in France. He didn't explain that the newer logo is often referred to as a "tent with its fly open," have a world-wide sexy meaning. Kahn's account of the recent "trouble" that ADL has had with the Cambridge and Arlington authorities, who succeeded in abolishing the work the company was doing for the federal government on nerve gas, agrees quite well with accounts printed in the Boston press. Had he chosen to be critical he might have asked why ADL chose to debate the issue using management personnel who had no gut feeling for the materials involved. Over the years research at ADL, both at Memorial Drive and at Acorn Park, has involved many compounds that were as hazardous to humans as the 10 ml of liquid agent under discussion. One wonders if the outcome of the controversy might have been reversed had ADL used the services of someone like the late Walter Coburn who had handled hazardous materials ever since the napalm days at Harvard and who, in addition, was on a first-name basis with Cambridge politicians.

Continued on page 10.

## BOOK REVIEW

Continued from page 9.

One also wonders whether Kahn was fully informed about some of the more controversial matters he describes. For example, there are alternative accounts of the departure of Warren C. Lothrop to become Vice-president of Armour and Co. and of the involvement in ADL in the ballistic range project in northern Vermont. The remunerative involvement of ADL in the management of John Sheehan's penicillin patent is described but inadequate reference is made to the effort by the ADL patent office and its organic chemists to convince the U.S. Patent Office that the beta-lactam closure involved in the synthesis was novel.

Until relatively recent times most of the history of ADL involved chemists and chemical engineers. The company has always played an important role in chemistry in New England, and currently is the fifth largest non-academic employer of chemists and chemical engineers in the area after Polaroid, W.R.

Grace, duPont, and G.T.E. It was disappointing to find that Kahn had not been apprised of many of the more up-to-date chemical activities at ADL. To remedy this situation I shall conclude this review by relating some of these that come to mind. I have been an ADL watcher for over 50 years (20 of which as a full-time non-travelling labman) and, as Kahn, I offer no excuse for not being encyclopedic. So as to avoid my careless omission of names I have not identified most of the professionals involved.

Kahn describes the financial troubles of ADL in the early thirties that were alleviated by Earl Stevenson's work for Lever Bros. in patent infringement suits with other soapers. The suits involved the mechanism by which hollow-grain detergent powders were formed. One patent claimed that in a hot drying tower droplets of concentrated detergent solution evaporated so as to leave a pocket of steam inside the solid grain, thus making it hollow. Stevenson provided Harold Edgerton at M.I.T. with funds to continue developing the novel high-speed motion picture

photography and used the technique to show that the detergent solution emerging from a nozzle swirled around and captured air, thus forming a hollow grain. As I recall it, Lever Bros. settled this one out of court.

During the late 1940s Warren Lothrop introduced a very successful program of technical audits for industrial companies. The teams of ADL people who made the critical surveys often included chemists and chemical engineers as well as MBA types. At the same time there was developed a successful world-wide service for the pulp and paper industry, which had been one of Dr. Little's first loves.

Dr. Lothrop also directed a very extensive program to evaluate current and novel high explosives for Army Ordnance. The results were published by G.R. Handrick in a *Chemical Reviews* article that developed a relationship between structure and explosive power. George Kistiakowsky used to poke fun at ADL by calling the entire program a boondoggle, when compared to the nuclear devices he had helped develop. However, high explosives are still very much with us 40 years later.

Following the Texas City disaster in 1947 ADL was retained to determine the conditions under which ammonium nitrate fertilizer could be continued to be used safely. The work went on for about 10 years and was directed by Raymond Hainer, a physical chemist whose name didn't make Kahn's index.

Edward R. Atkinson  
Amherst, Mass.

To be continued next month.

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## Board of Directors Meeting

Northeastern Section, ACS  
October 2, 1986

The October 2, 1986 meeting of the Board of Directors of the Northeastern Section of the ACS was called to order at 4:45 pm in the Cabot Room, Mallinckrodt Bldg., Harvard University, by Chairman D. Ciappenelli. The following members of the Board were present: P. Brauner, M. Burgess, M. Chen, C. Costello, D. Ciappenelli, A. Dey, L. Duffy, E. Garber, W. Gensler, T. Gilbert, W. Gleekman, G.R. Handrick, A. Heyn, E. Hopkins, D. Howell, J. Kaufman, T. Light, J. Neumeyer, J. Perkins, J. Piper, M.A. Solstad, and V. Wilcox.

**Chairman**—A bill has been introduced before the Massachusetts state legislature which may concern the liability of the members of the Section. A. Heyn suggested separate incorporation of the Board of Trustees as a holding company, to protect our assets. D. Ciappenelli suggested writing to the individual legislators.

**Treasurer**—J. Piper presented the Treasurer's report.

E. Hopkins brought up the subject of revocation of the ACS Liability Insurance. V. Wilcox commented that her personal insurance will not cover liability for chemists. An attorney whom she had contacted commented that she should incorporate as a small business. A. Heyn mentioned that such incorporation costs about \$750.

**Trustees**—G.R. Handrock gave an interim report on the financial standings of the trust funds. He asked that this report be officially made a part of the minutes.

**Constitution & Bylaws**—T. Light announced that the Section's vote on the formal setup on the Esselen Award will be scheduled for the Annual Meeting of December 1987 due to time requirements after the publication of the proposal.

T. Light presented the material on Constitution & Bylaws. The Board had a vigorous discussion about who exactly constituted voting members of the

Board of Directors. E. Hopkins suggested that we follow procedures of the National ACS in setting up committees (which would be reflected in the voting composition of the Board of Directors). It was pointed out that the National ACS has a number of important committees officially entitled "Other Committees" which accomplish valuable goals but are not essential to the governance of the Society.

**Board of Publications**—A. Dey, editor of the NUCLEUS, told the Board of Directors that the Board of Publication will look over the effect of the new look of the NUCLEUS at a November meeting. W. Adams will be having the printer use 50 lb. paper, which should improve the appearance by eliminating "show-through." M. Drury has been enlisted to help in the Circulation department.

G.R. Handrick presented an interim report of the activities of the Directory Maintenance Committee. The report also includes information on the number of members who paid local dues (slightly more than half), the latest membership (4512) and the number of NUCLEUS mailed. It was pointed out that these dues are indeed an important part of the budget.

**Public Service**—P. Brauner reported that the Public Service Committee has suggested that specific lectures attuned to the general public might be a good idea. These would be similar to the Christmas lectures given in England.

Another idea would be a Student Symposium on a subject such as material science, polymers, or forensic science. The Committee seeks input as to the nature of its presentations. Some of the members of the Public Service Committee are: G. Merton, W. Hopkins, P. Brauner, K. Stygall, C. Sojak, B. Bridges, and V. Wilcox.

**Safety**—J. Kaufman reported that *Guidelines for Laboratory Safety* is now

available. Copies may be obtained for the staff of each school at no charge.

The Symposium on Safety in the Workplace was held May 15, 1986 and over 100 attended.

**New Business**—D. Ciappenelli brought forward the fact that the Section has been awarded another Councilor on the basis of increased membership. After some discussion about the rules for reintroducing another councilorship, A. Heyn made the following motion:

The Board of Directors interpret the recent election results to mean that Truman S. Light be elected for a term of two years starting January 1, 1987 and those two section members who received the number of votes just under the previous limit for qualification to Alternate Councilor be declared elected as Alternate Councilors; the first of these for a term of three years (replacing T. Light), and the second of these for a term of two years (instituting the new alternate councilorship).

According to this, the three-year alternate councilor term will be served by Thomas Gilbert, and the two-year alternate councilor term will be served by Patricia Samuel.

This motion was VOTED by the Board of Directors.

It was pointed out that today, October 2, is P. Brauner's birthday. Congratulations were made.

E. Garber made the suggestion that retired members of the ACS be charged the student rate at official functions of the Northeastern Section. J. Perkins suggested that this idea should logically be given to Walter Gensler and the Retired Chemists' Group for study. The motion was so disposed.

The meeting was adjourned at 6:59 pm.

Respectfully submitted,  
David M. Howell, Secretary

Continued on page 14

## The October Meeting

Photos by Andrew Finland

The speaker, Dr. Morteza Janghorbani, is an engaging person of considerable charm, wit and most importantly, technical brilliance. His talk on "Stable Isotopes as Tracers in Human Metabolic Studies" reflected the result of years of effort dedicated to clarifying the complexity of mineral bioavailability for man. A practical alternative to the use of hot (radioactive) tracers, often characterized by long half-lives, is the use of stable isotopes of Fe and Zn for fecal monitoring.

Stable isotope tracer methodology uses naturally occurring non-radioactive tracers to enrich the diet with a given stable isotope of the mineral of interest. The theory and assumptions underlying this method are discussed in detail in his many papers. The principal assumption is that absorption of the stable isotope tracer (extrinsic tag) takes place from a common dietary pool and that the fractional absorption of the tracer will be the same as that of the nat-

ural mineral. For iron and for zinc this holds. Selenium biochemistry appears more complex. For dietary studies awareness of the many "host-diet" factors possible such as non-random errors that occur in "standard" metabolic balances studies is necessary. Stable isotope tracer methodology lends itself to infant mineral metabolism studies. Dr. Janghorbani studied absorption of dietary zinc in man. His data show that the extrinsic tag provides a valid approach to the measurement of intrinsic food zinc available. He has shown too, that for true absorption of dietary calcium and the factors that modulate its absorption and distinguish between unabsorbed calcium and that originating from endogenous secretions, an extrinsic tag with a stable isotope methodology works.

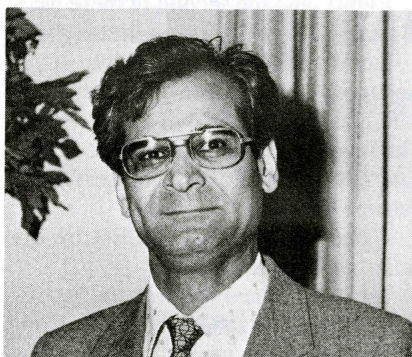
Methods discussed in detail were radio chemical neutron activation (NAA) and Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

NAA allows accurate measurement of the stable isotopes  $^{74}\text{Se}$ ,  $^{76}\text{Se}$ ,  $^{80}\text{Se}$  in matrices (feces, plasma, red blood cells, urine) in metabolic studies.

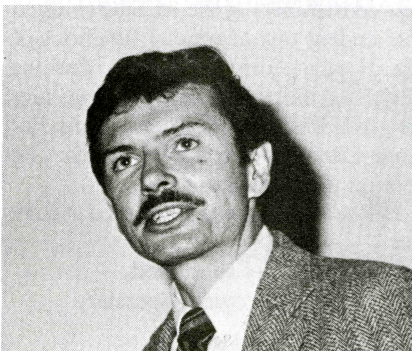
ICP/MS promises a major breakthrough for precise measurements of stable isotope ratios for a wide range of chemical elements. Ions are produced in an Argon plasma and are analyzed by a quadrupole mass spectrometer analyzer.

In his conclusion, as throughout his talk, Dr. Janghorbani emphasized the problems associated with ion generation, the complex nature of fecal matter, and the need for careful development of the analytical methodology. The capabilities and limitations should be evaluated for each specific set of isotopes in relation to the accuracy requirements of the intended application; the magnitude of interferences should be assessed in relation to the overall scheme of analysis.  $\diamond$

by Esther Garber



Dr. Morteza Janghorbani at the social hour.



Dr. Tom Gilbert, NESACS Chair-Elect, introducing the speaker.



Front row: Dr. James A. Golen, SMU; Dr. Larry Duffy, NESACS Membership Chairman; Dr. J. Donald Smith, SMU. Middle row: Rajiv Somam, Northeastern University; Beth Pulliam, SMU. Back row: Lisa Ventry and David Gottshall, Northeastern University; Dr. Bruno DePamphilis, Boston University.

## The November Meeting

Photos by Andrew Finland

At the 695th meeting of the Northeastern Section, American Chemical Society, the 35th James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry was made to Glenn A. Crosby of Washington State University, Pullman, Washington.

The meeting was chaired by our Chairman-elect, Lloyd Taylor, who introduced Joseph Bornstein of Boston College for comments about the award.

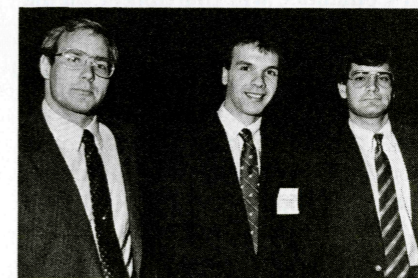
Dr. Bornstein, in reviewing the achievements of James Flack Norris, observed that "Jim" in 1924 had graduate students working on terpenes and was "researching with carbonium ions." Jack Roberts, his student, measured the  $K_A$  of diazomethane. Slides of the young "Jimmy" with Dr. Lythgove—1896 public health chemist—and also with Robert Mulliken were greatly appreciated by the seniors in the audience. It was Ann Chamberlain Norris, widow of Professor Norris, whose thoughtfulness makes our award meeting possible.

Ivan Legg, a colleague and former student of the awardee suggested Jane Crosby, the awardee's spouse, was equally deserving of recognition. Ivan, who worked for eight years with Glenn Arthur Crosby, was at a loss for words to extol this educator. Ethel Schultz graciously presented the award.

G.A. Crosby has worked with Hubert N. Alyea, 1970 award recipient and with William T. Lippincot, the



Mrs. Jane Crosby; Glenn A. Crosby, 1986 Norris Awardee; daughter Karen Crosby; sister Jean Barron; brother-in-law John Barron.



Graduate students Ioannis N. Houppis, Harvard, and David Casebier, MIT (both former students of Dr. Crosby); Ethan Simon, Harvard.

1982 award recipient. The November 1986 issue of the NUCLEUS details Crosby's impressive biography.

In his remarks, G.A. Crosby decried the enormous increase in student population at colleges as a factor in the shift to "superficiality" among today's state sponsored school students.

Teacher education is part of the

problem; so is "publish or perish." Today's student does not ask "How do I understand a problem," but "how do I get an 'A,'" i.e., "how do I get through the system?" The reduction in laboratory work is a strong negative for chemistry teaching; textbooks are not read by students—only today's teachers need them. Today's teachers need brains, organization and stamina. He suggests a return to core curriculum for "What you are is where you were."

Crosby suggests:

- 1 Stop confusing making things with understanding things
- 2 Cleverness is no substitute for education
- 3 Recognizing a 40 megabit disk is no substitute for creative intelligence, sensitivity for the "human condition" and commitment.  $\diamond$



Ethel L. Schultz, Chair of the 1986 Norris Award Committee, presenting the award to Glenn Crosby.



A.S. Obermayer, Eleanor Webster, J. Ivan Legg, J. Bornstein.

## BOARD MINUTES

Continued from page 11.

### November 13, 1986

The November 13, 1986 meeting of the Board of Directors of the Northeastern Section of the ACS was called to order at 4:40 pm in the Cabot Room, Mallinckrodt Building, Harvard University by Chairman D. Ciappenelli. The following members of the Board were present: E. Joseph Billo, Michaelene Chen, Donald Ciappenelli, Lawrence Duffy, Crist Filer, William Foye, Esther Garber, Walter Gensler, Wallace Gleekman, G. Richard Handrick, Arno Heyn, David Howell, Janet Perkins, James Piper, Myron Simon, Robert Stollow, Lloyd Taylor and Valerie Wilcox.

#### Committee Reports

**Archivist**—Sr. Magdalen Julie Wallace died shortly before the time of the Norris Award presentation. She had served many positions with the Northeastern Section and had represented us as a Councilor. She also served on the National C&B Committee. A memorial service for Sr. Magdalen J. Wallace was

held at the headquarters of her order in Worcester, MA.

E. Garber has consented to become the new Archivist.

Appeals for contributions, while worthy, provide a major policy decision on the part of the Section. It was decided that this decision should be handled by the Long Range Planning Committee.

**Awards**—W. Foye is now working on the Esselen Award. The plans for the Award will be made by the ad hoc committee until the time when the regular Committee takes over.

**Budget**—J. Piper requested tentative budgets from the 1986 committee chairs.

**Constitution & Bylaws**—M. Simon reported for the Esselen Committee. The candidates for the permanent Esselen Committee will first appear on the ballot in 1987.

**Hospitality**—M. Simon brought up the problem of responsibility for serving alcohol at regular monthly meetings. It was concluded that liquor should be served only at those meetings where the people in charge of that loca-

tion can take responsibility for those served.

**Richards Medal**—L. Taylor brought up the fact that one of the recipients of the Richards Medal had received a vermeil medal when the price of gold had risen to great heights. D. Ciappenelli identified that recipient as Henry Taube. The Board of Directors voted that Dr. Taube should receive the genuine gold medal to which he is entitled.

**Public Relations**—E. Schultz, Chairman of the Norris Award Committee, had specifically asked that a professional photographer be hired. Unfortunately, other Section officials had asked E. Simon to take the pictures at the meeting, since he had done so well in past meetings.

It was voted that an official letter of apology be sent to E. Simon explaining what had taken place.

**Public Service Committee**—V. Wilcox reported for the Committee. Hubert Alyea and Bassam Shakhshiri, both James Flack Norris Award winners, have consented to take part in the Christmas Lectures Program at the Museum of Science. The Public Service Committee asked the Northeastern Section to provide "seed" money. J. Perkins, Trustee, pointed out that the \$4000 could come from the income account of the Permanent Trust Fund. J. Piper pointed out that this would amount to increasing line 21 in the budget by \$4000. A motion was made to so transfer monies from the income account of the Permanent Trust Fund and was so VOTED.

#### Topical Groups

**Retired Chemists**—W. Gensler reported that the group is beginning to get organized. The original planning group includes Horace Faull and Esther Garber. There was an announcement in the May '86 NUCLEUS; one person responded.

**Old Business**—Dr. Gensler returned the motion (about reduced dinner charges) to the Board. It was VOTED to allow retired members of the Section to attend the dinners at the student rate for the months of January and February, 1987 as a trial.

Respectfully submitted,  
David M. Howell, Secretary ◇

## International Chemical Information Conference

"Chemical Structures: The International Language of Chemistry" is the theme of the May 31 to June 4, 1987, international chemical-information conference to be held in Noordwijkerhout, The Netherlands. The conference is cosponsored by the American Chemical Society's Division of Chemical Information, the Chemical Structure Association (U.K.), and the Chemical Information Groups of the German Chemical Society and the Royal Chemical Society (U.K.). Technical sessions will cover integrated, in-house information-retrieval systems, substructure and generic structure searching, new technologies applied to chemical information, databanks, chemical reaction indexing and retrieval and synthesis planning, and the requirements for chemical-information systems of the 1990s. The conference will bring to-

gether international experts and chemical-information professionals to discuss and to further basic and applied research and development in the processing, storage, retrieval, and use of chemical structures.

The Leeuwenhorst Congress Center will be the site of the conference. The registration fee of \$350 (Dfl 870) includes full room and board at the Center. (After January 15, 1987, the fee will increase 20%.) Registrations close on March 31, 1987.

For more information or to submit a poster for the poster sessions, contact:  
David K. Johnson  
Exxon Research and Engineering Company  
Post Office Box 101  
Florham Park, New Jersey 07932  
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## Patterson-Crane Award Nominations

Nominees for the 1987 Patterson-Crane Award are being sought by the Columbus and Dayton, Ohio, sections of the American Chemical Society.

An international honor, the Patterson-Crane Award acknowledges contributions to the field of chemical literature, especially chemistry documentation, chemical information storage and retrieval, and implementation and management of chemical information services.

The biennial award, consisting of a \$2000 honorarium and a personalized commendation, is given in honor of Austin M. Patterson and B.J. Crane, previous editors of Chemical Abstracts.

Nominations for the award must be in writing and should discuss the nominee's contributions to the field as well as include supporting material and an evaluation of the nominee's accomplishments. Seconding letters are required.

Three copies of the nomination should be sent to The Patterson-Crane Award Committee, Priscilla Ratliff, Chairman, Ashland Chemical Company, P.O. Box 2219, Columbus, OH 43216, by January, 1987.

Nominations will be judged by a seven-member selection committee consisting of Dayton and Columbus Section members as well as the Chairman of the American Chemical Society's Division of Chemical Information.

The 1987 Patterson-Crane award will be presented on June 25, 1987, at an awards dinner held at Ashland Chemical Company, Columbus, Ohio. The dinner will be part of the 19th American Chemical Society Central Regional Meeting.

To receive an informative brochure about the award contest, contact Ratliff at the previously listed address. ◇

### Medical Chemistry Group Northeastern Section ACS

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# Calendar

## Monday, January 12

Professor Elizabeth C. Thiel (North Carolina State University)  
"Ferritin: Structure, Function, and Gene Regulation"  
Brandeis University  
Gerstenzang 122 at 4:00 P.M.  
Refreshments at 3:30 P.M.

## Tuesday, January 13

Dr. Michael Sela (Weizmann Institute of Science)  
Title to be announced  
Tufts University  
Health Science Campus  
Sackler A at 4:00 P.M.

## Thursday, January 22

Dr. Charles S. Baer (DuPont)  
"Agricultural Residue Chemistry: Finding the Needle in the Haystack"  
Southeastern Massachusetts University  
Science and Engineering Building Room 305 at 11:00 A.M.

## Monday, January 26

Professor Eugene Stanley (Boston University)  
"The Puzzle of Water and Its Structure"

Brandeis University  
Gerstenzang 122 at 4:00 P.M.  
Refreshments at 3:30 P.M.

## Tuesday, January 27

Dr. David Ward (Yale University)  
Title to be announced  
Tufts University Health Science Campus  
Sackler A at 4:00 P.M.

## Thursday, January 29

Dr. David E. Cane (Brown University)  
"Cell-Free Studies of Terpenoid Biosynthesis"  
Southeastern Massachusetts University  
Science and Engineering Building Room 305 at 11:00 A.M.

Notices for the NUCLEUS Calendar should be sent to:

Marilyn J. Schneider  
Department of Chemistry  
Wellesley College  
Wellesley, MA 02181  
Phone: 235-0320, ext 3031

(Note: Material should be sent so that it arrives by the first of the month *prior* to the month for which the event is scheduled.)

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Questions on the ACS credit policy should be directed to Earl Klinefelter, Head of the Membership Activities Department at (202) 872-4372.

### NOTICE TO OUR READERS

*Let us know if you don't get your February issue.*

*Starting with the February, 1987 issue our mailing labels will be coming from the ACS national office and not from our faithful local supplier, Dr. G. Richard Handrick.*

*If you don't get your February issue by February 1st or if you want your label changed, call the ACS national office, (202) 872-4600. Thank you.*

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