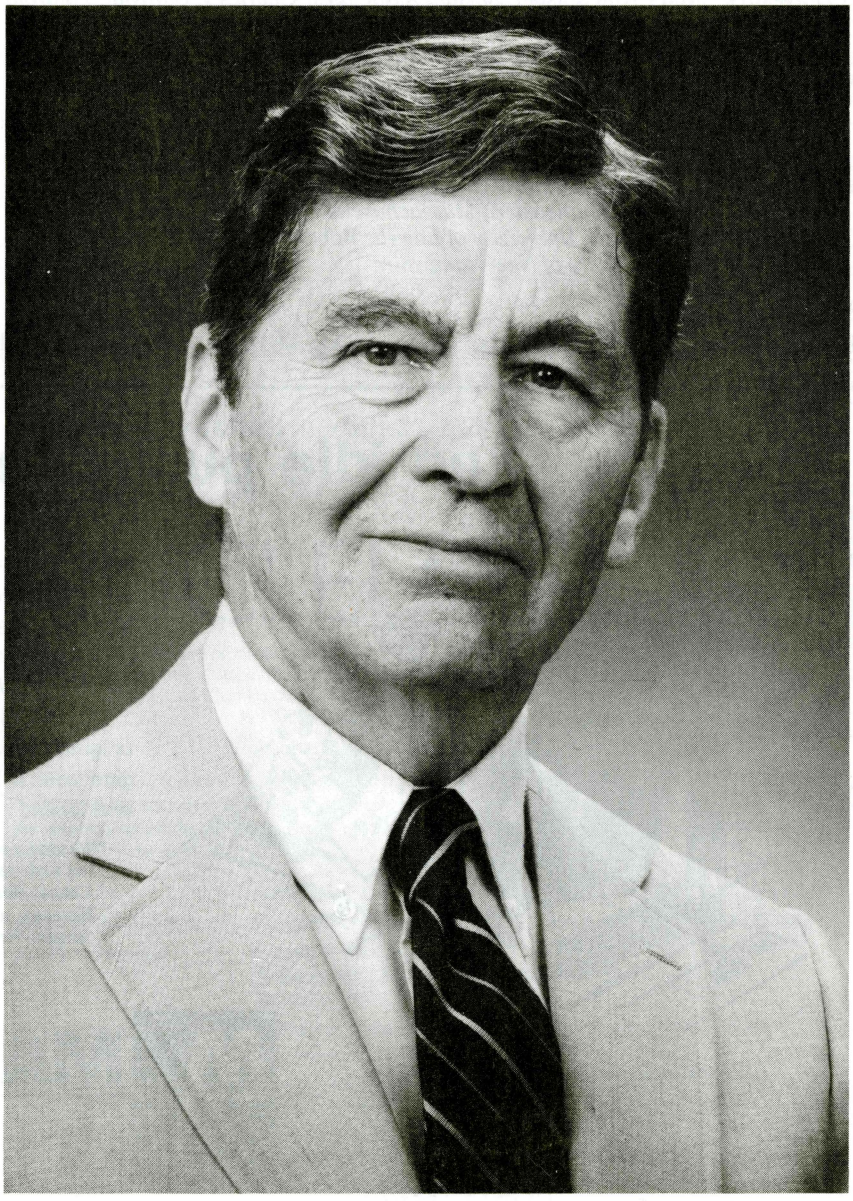
THE NUCLEUS

March 1988 *Of the Northeastern Section of the American Chemical Society* *Vol. LXVI, No. 6*

Monthly Meeting:

Richards Medal to be presented to W.H. Stockmayer



1988 NESACS Slate

1987 Trustees Report

Norris Summer Scholar Report—III

1988 NESACS Candidates for Election

Chairman-elect
E. Joseph Billo, *Boston College;* Norman Lichtin, *Boston University*

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Nominating Committee
Michaeline F. Chen, *AMMRC;* Donald J. Ciappenelli, *Harvard University;* Arlene Light, *Kendall Company;* Peter Meltzer, *Organics Inc.;* Kay Onan, *Northeastern Univ.*

James Flack Norris Award Committee
Thomas Greenbowe, *Southeastern Massachusetts Univ.;* David Haines, *Wellesley College;* Donald Hilton, *University of Lowell;* Robert O'Malley, *Boston College;* Frank L. Pilar, *University of New Hampshire*

*incumbents

1988 Nominating Committee: L. Taylor, Chair; A. Dey, M. Hearn, T. Gilbert, D. Smith.

Members of the Northeastern Section who wish to be nominated for an elective office are urged to submit their names according to the following procedure:

Petition Candidates: "In accordance with the Northeastern Section Constitution, Article VIII, section 3, 'Any group comprising 2 percent or more of the membership of the Northeastern Section may nominate candidates for any elective office provided that such nomination (accompanied by the signature of the nominating group) shall be presented in writing to the Chairman of the Nominating Committee not more than ten days following the March meeting of the Northeastern Section." Accordingly, such petitions are due by March 20, 1988, and should be sent to Dr. L.D. Taylor, Polaroid Corp., Cambridge, MA 02139. At least 100 valid signatures are required and it is suggested that the petition be sent by registered mail. ◇

The Northeastern Section of The American Chemical Society Inc.
Office: Karen Piper, 19 Mill Road, Harvard, MA 01451, in 617 area 1-800-872-2054; (617) 456-8227
Any ACS Business may always be conducted via the business office above.

Contents

Cover: *Professor W.H. Stockmayer, 1988 Theodore William Richards Medalist*

April Issue Deadline: *February 20, 1987*

THE NUCLEUS

Dedicated to the Memory of James Flack Norris
Published monthly from October to May by the Northeastern Section of the American Chemical Society, Inc.

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Editor:	Adrienne S. Dey, 215 Fisher St., Needham, MA 02192; Tel: 444-5933
Board of Publications:	Harry W. Orf (Chairman), Jean Vnenchak, Catherine E. Costello
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Contributing Editors:	Edward Atkinson, History of Chemistry, Book Reviews; Maryann Solstad, Health; Marilyn Schneider, Calendar; Bill Adams, Cartoons.
Circulation Manager:	Mark A. Druy, 88 Park Ave., Apt. 202, Arlington, MA 02174. Tel: 641-1957
Proofreaders:	Arno H.A. Heyn, Donald Rickter

1987 Board of Trustees Report

The essence of the activities of the Board of Trustees is managing the Section's endowment funds during 1987 is expressed in Table 1 below.

New cash income of dividends and interest from the interconnected capital and "income accounts" amounted to $62,685 in 1987, or 10% greater than it was in 1986 ($56,046). Some rather substantial capital gains accounted for a large part of this increase. At the same time, $7,345 of this amount was converted to the capital base by reinvestment of dividends. An additional $16,954 was introduced into the "income account" cash base by sale to the Consolidated Account of securities in the Norris and Permanent Trusts. (See Table 1) The Section was reimbursed $31,020 for their expenses on activities permitted by these endowment funds. The Section budget for these expenses in 1987 was $40,060. Another $5,480 went directly to National ACS in support of the National Norris Award.

New cash income for 1988 is expected to be about $36,100 from investments in the Consolidated Fund (net, after currently scheduled reinvestment of another $9,100 of income), and about $8,700 from investments in the "income accounts". When this total of $44,800 is added to the cash balance of $60,600 on 12-31-87 (Table 1), it would appear that a considerable amount of liquid assets will have accumulated to the Section's benefit during 1988. In other words, the resources for 1988 will allow us to be less "tight" than in recent previous years.

The Trustees caution once again, however, that the Section must view these sums of money in the proper perspective, remembering that each of the Trust Funds has its restrictions on how the money may be spent—it is not wildly interchangeable. The Publications Trust is the poorest of the funds, compared to the demands often made on it. The Norris Trust ordinarily has expenses nearly equal to the annual new income. The unexpended balance in the Richards Trust has grown so that it may be possible either to implement an award every year instead of the current alternate years, or to provide an encomium in addition to the medals now given as the prize. The Permanent Trust occasionally may be allowed a more substantial supplement to counter the deficit budget that the Section prepares for its operating expenses out of income from other sources. The Esselen Award is receiving and spending at about the level intended by the donors when it was established.

By portfolio changes during 1987, $24,600 from the cash balance and 1987 income of the Consolidated Fund was converted to new investments, in order to increase its capital base. Reinvestment of dividends ($7,345) accounted for 30% of this addition.

By the end of the year the value of the assets in the total portfolio had fallen to $880,041, from a value of $937,857 at the beginning of the year. The capital investments of the Consolidated Fund were valued at $582,977 on 12-31-87, compared to $616,890 at the year's start,

continued on page 7

Table 1. Cash Flow And Status Of Trust Funds—1987

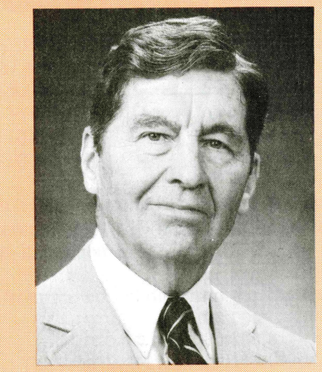
	balance: cash + AMA 12-31-86	balance: cash + AMA 12-31-87	net income new cash	expenses total	expenses to Section	1987 Section budget	Market value of sec.[j] 12-31-87	est. income for 1988
Consolidated	$12,781[a]	7,202[b]	19,448[c,d]	25,027[g]	422	1,300	582,977	45,183[k]
Richards	11,631	17,642	7,716	1,705	1,700	2,000	44,053	3,066
Norris	2,341	16,194	36,572[e]	22,719[h]	17,234	25,320	32,478	2,663
Publications	2,323	4,702	3,379	1,000	1,000	1,000	6,560	620
Permanent	7,689	10,172	11,090[f]	8,607	8,602	9,140	27,043	2,307
Hill	4,838	4,669	1,889	2,058	2,053	1,300	-0-	-0-
	41,603	60,581	80,094[i]	61,116	31,020	40,060	693,111	53,839
Esselen	-0-	1,147	9,222	8,075	7,555	9,000	125,202	9,000
TOTALS	$41,603	61,728	89,316	69,191	38,575	49,060	818,313	62,839

a) Plus $31,880 of capital held as cash-in-escrow.
b) Plus $6,946 of capital held as cash-in-escrow.
c) An additional $32,000 was received and distributed to the "income accounts".
d) Excludes amounts received by sale and exchanges of capital.
e) $14,465 of this came from exchange of stock for cash from Consolidated.
f) $2,489 of this came from exchange of bonds for cash from Consolidated.
g) $24,600 of this was cash not in escrow-as-capital and went for purchase of new stocks and bonds to increase the capital base.
h) $5,480 went directly to National for the National Norris Awards in 1987 and 1988.
i) Net new income, exclusive of sale of securities by Norris and Permanent Trusts, was $63,140.
j) Does not include cash or AMA assets.
k) About $9,100 of this is currently scheduled for reinvestment as non-expendable capital.

March Meeting

The Theodore William Richards Medal Award Meeting

Thursday, March 10, 1988



Harvard University Faculty Club

5:30 p.m. Prepandial Hour

6:30 p.m. Dinner
Harvard University Science Center, Lecture Hall B

8:15 p.m. Biography of Theodore William Richards—Dr. Dietmar Seyferth—Massachusetts Institute of Technology

8:25 p.m. Introduction of Medal Recipient—Dr. John S. Waugh—Massachusetts Institute of Technology

8:35 p.m. Presentation of Medal to Professor Walter H. Stockmayer—Dr. Thomas R. Gilbert—Northeastern University

8:40 p.m. Richards Medal Address—"Adventures with Chain Molecules"—Prof. W.H. Stockmayer—Dartmouth College

9:40 p.m. Reception for Awardee

Dinner reservations should be made not later than March 4. Please call Mrs. Karen Piper at (617) 456-8227 or (800) 872-2054. Reservations not cancelled at least 24 hours in advance will be billed for the dinner price. Members, $18.00; Non-members, $20.00; Students and Retirees, $5.00. THE PUBLIC IS INVITED.

Abstract

Adventures With Chain Molecules

In 1969 Paul Flory wrote that "a firm grasp of the interrelationships between conformation and chemical structure is essential for the rational interpretation of the properties of chain molecules." The speaker thus justifies his intention to describe semi-historically (and with only occasional involvement of his own work) the routes by which valid conformational descriptions were attained for polymer chains, both generally and for several specific examples, including poly(tetrafluoroethylene), olefin/SO_2 copolymers and homopolypeptides. ◊

Biography

Walter H. Stockmayer

Walter Stockmayer grew up in Rutherford, New Jersey, and graduated from M.I.T. in 1935. After two years at Oxford (where rowing took precedence over chemistry) he returned to the Institute and attained the Ph.D. degree in 1940, with a thesis directed by James A. Beattie on the equation of state of gas mixtures. He became an Instructor in Chemistry at M.I.T. in 1939, and remained in the Department, save for a two-year interlude at Columbia, until he moved to Dartmouth College in 1961. At Dartmouth he has been Albert W. Smith Professor Emeritus since 1979, but has kept busy as a part-time teacher and researcher and as an Associate Editor of *Macromolecules*. In his spare time he plays chamber music, hikes, skis a little, plays some tennis, and otherwise demonstrates the validity of Parkinson's Law.

Stockmayer's interest in polymers began suddenly at Columbia in 1942 as the direct result of reading some papers by Paul J. Flory on the chemical statistics of gel-forming polymers. He has worked on a variety of theoretical problems in macromolecular science, including light scattering, chain conformations and chain dynamics. His students and postdocs at M.I.T. and Dartmouth have contributed useful experimental work in these areas, many of them by application of dielectric relaxation techniques, which were first learned by Stockmayer from Arthur Von Hippel during the war years. He has enjoyed collaborating directly with many distinguished colleagues, including Gardner Swain, Clark Stephenson, Carl Garland, John Waugh, Bruno Zimm, Marshall Fixman, Robert Cole, Fred Billmeyer, Henri Benoit, Sam Edwards, Walther Burchard, G.V. Schulz, Ronald Koningsveld, Michio Kurata and Hiromi Yamakawa.

Honors that have come to Stockmayer include election to membership in the National Academy of Sciences in 1956. He has received the ACS Award in Polymer Chemistry, the Peter Debye Award in Physical Chemistry, the APS High Polymer Physics Prize, and the National Medal of Science (1987). He is an honorary fellow of Jesus College, Oxford, and has honorary degrees from Strasbourg. ◊

1988 NESACS Budget Proposal

Annual Account	#	1987 Actual	1988 Requests	1988 Proposed General	1988 Proposed Offsetting	From Acct
National Allotment	10	14,050.00		14,819.00		
Travel Grants	11	1,628.03			1,650.00	
Local Dues	12	17,898.50		17,900.00		
New-member Commission	13	30.00		30.00		
Contributions	14	9,375.00			6,400.00	
Ashdown Awards	15	1,000.00			2,000.00	
Continuing Education	16	22.00			500.00	
Hospitality	17	3,540.50			3,000.00	
Savings Interest	18	1,026.28		700.00		
Miscellaneous	19	0.00				
Trustees: Cons. Acct	20	422.39			200.00	
Perm. Inc. Acct.	21	8,602.59			5,000.00	
Norris Inc. Acct.	22	17,661.04			26,752.00	
Richards Inc. Acct.	23	1,700.00			10,000.00	
Publ. Inc. Acct.	24	1,000.00			8,500.00	
Hill Award	25	2,053.50			1,400.00	
Esselen Award	26	7,555.07			9,000.00	
NERM	27	306.59				
Summer Programs	28	0.00			1,700.00	
Advertising	29				13,000.00	
INCOME TOTALS		**87,871.49**		**33,449.00**	**89,102.00**	
Chairman	50	241.70		200.00		
Business Office	51	2,219.95	1,750.00	1,750.00		
Treasurer	52	91.20	3,200.00	200.00	3,000.00	21
Archivist	53	153.30	150.00	150.00		
Publication	54	0.00	9,294.00		8,500.00	24
Nucleus	55	17,200.25	24,340.00	11,590.00	13,000.00	29
Directory Maint.	56	1,207.60				
Program	57	656.18	3,500.00	1,500.00		
Ballots	58	2,716.38		2,750.00		
Public Relations	59	309.60	350.00	350.00		
Education	60	267.84		500.00		
Newell Awards	61	0.00			500.00	21
Ashdown Awards	62	1,672.68			2,000.00	15
Continuing Education	63	0.88			500.00	16
Hospitality	64	3,024.46	3,500.00	500.00	3,000.00	17
Hill Award	65	1,260.74	1,400.00		1,400.00	25
Norris Award	66	12,276.58			15,000.00	22
Speakers Bureau	67	332.51	1,280.00		1,280.00	22
Summer Scholars	68	7,736.19	10,472.00		10,472.00	22
Richards Medal	69	1,706.30			10,000.00	22
Esselen Award	70	11,129.66	9,000.00		9,000.00	26
Sec. School Award	71	1,767.09			1,200.00	14
Aula Laudis	72	18.96			200.00	14
Trustees	73	449.21	200.00		200.00	20
Safety Committee	74	1,600.00	4,225.00		1,500.00	21
High School Group	75	0.00				
Chairman-elect	76	378.70		500.00		
Membership Committee	77	42.75		200.00		
Public Service	78	5,317.84			5,000.00	14
Retired Chemists	79	225.84		200.00		
Summer Programs	80	0.00	1,700.00		1,700.00	
Travel Grants	81	4,418.04		3,300.00	1,650.00	
Adm. Secretary	82	9,015.84	9,600.00	9,600.00		
Miscellaneous	83	0.00	150.00	150.00		
NERM	84	0.00				
EXPENSE TOTALS		**87,438.27**		**33,440.00**	**89,102.00**	

Notes to 1988 Budget

14,15 This budget is balanced, in part, by postulating substantial contributions, none of which are assured. The 1987 gifts consisted of the following:

Polaroid	$5000
G. Esselen	3350
For the 86 Holiday Lecture	1025
For the Ashdown Awards	1000

21 Although only $5000 is budgeted from the Permanent Trust Fund, a shortfall in contributions or advertising revenue (29), or an overrun on the Directory would have to be made up from this account.

29 This is a new line item resulting from the consolidation of the Nucleus books with the operating account.

54 This entire budget is for a directory. The total cash available by the end of 1988 in the Publications Income Account is estimated at $8500.

55 The Board of Publications request is compared to the Budget Committee proposal which assumes increased advertising revenue both from increased rates and volume of advertising. Also proposed is an adjustment in the commission to the advertising manager, revising it to 15% of the first $10,000 and 25% thereafter.

	Publ Request	Budget Prop
Expenses		
Eight issues @ 3240	25920	25920
Editor	2000	2000
Advertising Manager		
25% (8000)	2000	
15% (10000) + 25% (3000)		2250
Miscellaneous	900	900
TOTAL	30820	31070
Income		
Advertising	7700	13000
NET	23120	18070
Charged to budgets 66 & 69	6480	6480
Required from budget 55	16640	11590

68 Apparently, the Summer Scholars Committee is requesting funds to award an additional scholarship for 1988 (4 @ $2500).

74 The Safety Committee requested $3000 for the Laboratory Safety Workshop plus $1225, most of which is for a workshop for school superintendants. The Budget Committee recommends $1500 from the Permanent Trust Income Account. The initial funding of $3000 for the Workshop several years ago was voted as seed funding, and the Permanent Trust Fund is heavily committed in backing up other projects (see note at 21).

81 The intent of the Budget Committee was to fund Councilor travel to both meetings. However, since one meeting is in Los Angeles, the budgeted amount may be insufficient.

Respectfully submitted,
T. Gilbert, J. Perkins, J. Piper, M. Simon, L. Taylor

Trustees Report

continued from page 4

a drop of 5.5%, which doesn't seem so bad in light of the scary ups and downs of the stock market in 1987. The Dow-Jones industrial average was just about the same on 12-31-87 (1938.83) as it was on 1-2-87 (1927.30).

Trustees for 1987 were Drs. Janet Perkins, Arthur S. Obermayer, and Myron S. Simon. Dr. Walter J. Gensler served part of his term beginning in 1987, but he resigned the position in April for personal reasons. In July, sadly, he died of a heart ailment. Dr. Phyllis A. Brauner was elected to a three-year term beginning in 1988 to replace Dr. Simon. Unexpected trauma was encountered when our account manager at Merrill Lynch changed his job. After considerable research and agonized study, the Trustees voted to keep Mr. Robert Sarly as management advisor, and to move our accounts to E.F. Hutton Inc., along with Mr. Sarly. The Trustees convened for six formal meetings in 1987.

Since July, G. Richard Handrick, a former Trustee, has been helping the Trustees with the mundane details of the financial transactions and the changeover to Hutton as brokerage firm. He has prepared this report for them. Another report in greater depth of detail has been written for the Trustees' use, and a different one has been submitted as part of the Annual Report of the Section to National ACS. Each of these can be made available for perusal by any member upon request to Karen Piper, Administrative Secretary. ◇

Prepared by G. Richard Handrick
20 January 1988

1987 Norris Summer Scholar Reports—III

Biochemical Identification of Gangliosides on the Surface of the Myelin Sheath

Kim Farrell
Dept. of Biochemistry
Emmanuel College

Faculty Advisor:
Allen L. Ganser
Dept. of Neuroscience
Children's Hospital, Boston

The myelin sheath surrounds and insulates nerve fibers. The surface of myelin is presumably the site that the immune system recognizes and attacks in the human demyelinating disease of multiple sclerosis. The localization and the identification of myelin surface gangliosides is our topic of research. Gangliosides are sialic acid containing glycolipids that are abundant in the central nervous system and may be involved in the breakdown of the myelin in multiple sclerosis. The immune cells and antibodies may specifically recognize the surface components of myelin as a first step in the destructive process.

The research project of this summer is ongoing and aims at developing a technology of isolating, separating, detecting, and quantifying gangliosides, especially the *poly*sialogangliosides, on the myelin surface. The techniques must be extremely sensitive because not many cells are present in our preparations and the surface molecules are not abundant. Other investigators have devised small aspects of the overall technology that we are trying to develop. The lower limit of detection in previous literature is femtomolar quantities of ganglioside (Otnaess and Laegreid, 1986). Our task this summer has been to bring together these different techniques and to apply them to the analysis of cell surface glycolipids.

Overview of Methods. The total ganglioside pool is extracted from separated, myelinated nerve fibers of mouse sciatic nerve (as an initial test nerve). Gangliosides are separated by high-performance thin-layer chromatography (HPTLC). The gangliosides and the silica gel are "attached" to the plate with a methacrylate plastic. The lipids are detected on the plates by 1) incorporating biotin into the sialic acid portion of the ganglioside molecules, 2) binding an avidin-phosphatase complex to the biotin labels, and 3) visualizing the phosphatase enzyme with a precipitating, color reaction. Gangliosides are identified by co-migrating known standard lipids. Quantitation is accomplished with a scanning microdensitometer.

The presence of a polysialoganglioside on the surface of the myelinated fiber is established by degrading specifically the surface polysialogangliosides to the monosialoganglioside G_{M1}. This is accomplished by incubating intact, separated, myelinated nerve fibers with the enzyme *Vibrio cholerae* sialidase. The enzyme is very large and does not penetrate the surface membranes and therefore does not degrade internal gangliosides. After this treatment, the sialidase is washed off and the total ganglioside pool is extracted and analyzed as described above. By comparing the gangliosides present in normal extracts with those from nerves treated with sialidase, we conclude that the lipids that are diminished or not present on the sialidase treated fibers are on the surface of the myelinated fiber. These "missing" polysialogangliosides are now present as monosialoganglioside. A quantitative comparison will be made by analyzing the densitometric scans.

Separation. The separation of gangliosides was accomplished by creating a chromatography solvent system which enabled us to use the least amount of purification of the nerve extract. Using Zanetta's chromatography solvent system, (methyl acetate, n-propanol, chloroform, methanol, and 0.25% KCl; 25:20:20:20:17, v/v; Zanetta et al., 1980), we were able to get clearly distinguishable bands of commercial gangliosides even when they were mixed with the phospholipids and glycolipids which are present in the tissue extracts (Fig. 1). The bands of gangliosides were visualized in this case with a charring method which was sensitive to 25 picomoles of the ganglioside G_{T1b}. The contaminating phospholipids and glycolipids separated away from the gangliosides and did not disturb the migration of the gangliosides. This showed that we would not have to purify the gangliosides by an additional method before chromatography.

Micro Detection Method. The first step in the detection method was to oxidize the vicinal hydroxyls on gangliosides to aldehydes with 10mM sodium-metaperiodate. This high amount of periodate ensured that not only the sialic acids of the gangliosides were oxidized, but other sugars with vicinal hydroxyls as well. Some *asialo*gangliosides may be present and it would then be helpful if other sugars reacted with the periodate. The oxidation of the gangliosides on the silica gel plates lasted for 30 minutes at room temperature.

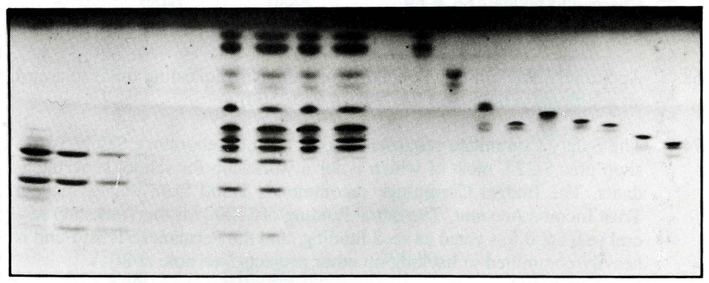


Figure 1. *HPTLC separation of gangliosides and other lipids of myelin. Lanes 1 through 18 go from left to right. Lanes 1, 2, 3, 4 and 5 are bovine brain gangliosides at concentrations of 1 μg, 1 μg, 0.5 μg, 0.1 μg, and 0.05 μg/band of the major components G_{M1}, G_{D1a}, and G_{T1b}. The sixth and the seventh lanes are mixtures of gangliosides (at 1 μg/band) and lipid extracts from the mouse sciatic nerves. The ganglioside bands co-migrate with pure gangliosides indicating that the contaminating nerve lipids could be separated out with this system of chromatography. The eighth and the ninth lanes are total lipid extracts of mouse sciatic nerve. The tenth through eighteenth lanes contain various standard phospholipids and glycolipids use to identify the lipids in the nerve. Lipids are visualized in this case by charring with 10% $CuSO_4$ and 8% H_3PO_4 in water.*

After 30 minutes of washes with 0.15M NaCl, 10μM biotin-X-hydrazide in DMSO and 0.15M NaCl were reacted with the gangliosides on the silica gel plate. This reaction ran for 60 minutes at room temperature. The hydrazide portion of the compound reacts with the aldehydes generated from the vicinal hydroxyls. The plates were then washed with NaCl for 30 minutes. A blocking reagent was then used to block sites that would bind non-specifically the avidin-alkaline phosphatase. The blocking reagent was a mixture of 1% BSA, 1% non-fat milk protein, and 0.1% Tween (a nonionic detergent). Blocking was carried out for 15 minutes at room temperature. The non-fat milk protein (powdered milk) was found to be a cheap alternative to the usual lysozyme. This blocking incubation proved to eliminate some of the background staining on the silica gel.

Coupling with Avidin-alkaline Phosphatase. 10nM avidin-alkaline phosphatase then reacted with the gangliosides on the silica gel plate. The avidin has a strong affinity for the biotin ($K_D = 10^{-14}$). This reaction ran for 60 minutes at room temperature.

Visualization. The visualization reaction involves 1) the enzyme catalyzed removal of phosphate from indoxyl phosphate (i.e., 5-bromo-4-chloro-3-indolyl phosphate, BCIP), 2) oxidation of the generated indoxyl intermediate to indigo white, and 3) transfer of the electrons (reduction) to nitro blue tetrazolium (NBT) to form diformazan, a dark blue precipitate. A solution of 0.7mM BCIP, 0.1mM NBT, 0.25mM magnesium chloride, 100mM Tris/HCl (pH 9.0), 1% ethanol, and 1% dimethyl formamide was prepared in the dark. The plate was exposed to the visualization solution for 30 minutes in the dark and then washed with double distilled water and 2% ethanol/dimethyl formamide. These washes took 60 minutes to ensure that the reaction had been stopped.

Progress Report on the Micro Detection System. The reagents and reaction sequence described above were tested with fetuin, a sialic acid containing protein, bound to nitrocellulose paper. 10μg of fetuin was applied to a nitrocellulose strip and clearly produced a spot at the end of the whole reaction sequence (Fig. 2). 10μg of ganglioside G_{M1} produced a similar spot on nitrocellular strips (Fig. 2.) We also applied methacrylate to the nitrocellulose paper to see what effect this had on the microdetection system. 0.1% methacrylate lowered the background staining and also produced more intense staining of the fetuin and ganglioside.

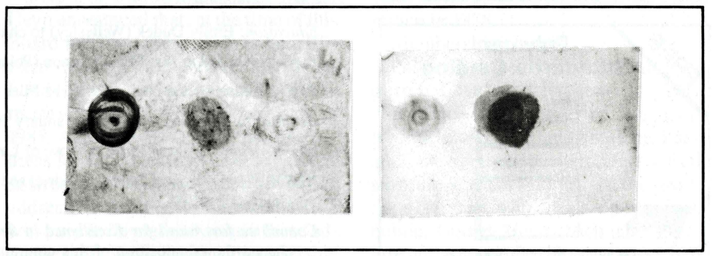


Figure 2. *Fetuin and G_{M1} ganglioside spotted on nitrocellulose paper and detected with our reaction sequence. Both panels contains from left to right 10μg ganglioside, 10μg fetuin, and 0.1μg ganglioside. blots have spots in three lanes: lane 1) 10μg of ganglioside 2) 10μg of fetuin and lane 3) 0.1μg of ganglioside. The paper in the right panel was covered with 0.1% methacrylate. The results illustrate that the detection system is effective and that methacrylate reduces background staining.*

We have found that periodate does not oxidize the gangliosides on the silica gel plates. 10μg of G_{M1} was spotted on plastic backed TLC strips and no blue reaction product was observed (in contrast to the fetuin or ganglioside on nitrocellulose paper; see above). We suspect that the vicinal hydroxyl groups are strongly hydrogen bonded to the Si=0 moieties of the silica gel and are thus unable to form the coordination complex necessary for oxidation. Several experiments are planned to solve this problem. To disrupt H-bonds the oxidation with periodate will be carried out at acid pH. In addition, we will try the detection system on reversed phase HPTLC plates where the silica gel is completely derivatized with hydrocarbon and unable to H-bond. Finally, we also plan to use normal HPTLC plates and derivatize the carboxyl groups of the sialic acids (which may not interact as strongly as hydroxyl groups with the silica gel) with a carbodiimide/biotin-hydrazide reaction. ◇

References

Otnaess, A-B. K. and Laegreid, A. (1986) Detection of femtomolar quantities of the ganglioside G_{M1} on thin-layer chromatography plates by native cholera toxin and labeled antisera. *Current Microbiol.*, **13,** 323–326.

Zanetta, J-P., Vitiello, F. and Vincendon, G. (1980) Gangliosides from rat cerebellum: Demonstration of considerable heterogeneity using a new solvent for thin layer chromatography. *Lipids*, **15,** 1055–1061.

NESACS Board of Directors

Condensed Minutes for March–May 1987

Because of changes in the business office of the section, minutes of board meetings have been delayed. A summary of actions taken, appointments and other important matters is given in the following:

Board of Directors: Additional ex-officio board members because of being divisional councilors are: John Newmeyer*, Robert Fields, Michael Strem. (* is on the board already).

Trustees: The elected trustees for 1987 are: Janet S. Perkins, Walter J. Gensler, Arthur Obermeyer. After the resignation of W.J. Gensler the board elected Myron Simon to serve the remainder of 1987.

Committee Appointments:

Education: Emily Dudek (Wellesley) to chair the undergrad. research symposium.

Professional Relations: Myron Simon (Polaroid) appointed as chairman.

Public Relations: Co-chaired by Crist Filer (DuPont) and Patricia Samuel (Boston U.).

Hospitality: Kate Steigel, starting January 1988.

Membership: Vacant because of move of Lawrence Duffy to Alaska.

NERM Representative: James Hendrickson (Brandeis) for 1987, Robert O'Malley (Boston College) for 1988.

Committee for Award for Excellence in Secondary School Teaching: The board voted to change the composition of this committee to include two Aula Laudis members, one secondary school NEACT member and two others appointed by the board.

Retired Chemists: Chairmanship vacant because of W.J. Gensler's resignation.

Business Office: Because of the resignation of Janice Fineman effective March 1, the business office was moved to Northeastern University, then later, because of staffing problems, Mrs. Karen Piper was appointed to be in charge of the business office. Arrangements for an 800 number for Massachusetts calls have been made.

A vote of thanks was transmitted to Mrs. Janice Fineman in recognition of her 11 years of devoted service to the section.

Finances and Budget: It was VOTED to borrow $1000 from the 1988 income account of the Esselen Award Fund to cover start-up expenses. It was VOTED to reinstate the Secondary School Award.

Hospitality: It was announced that the price for dinners would be raised to $13 to cover the increased costs. It was voted to continue the discounted dinner prices to retired members until June 1988.

Publications: William Adams resigned as Business Manager, effective July 1, 1987, but is continuing as Advertising Manager. The Board of Publications appointed, with board approval, Russell F. McCann as Business Manager, effective July 1, 1987.

It was VOTED to reappoint the editor, business manager, advertising manager and circulation manager for a period ending June 30, 1988. (see infra)

Constitution and Bylaws: On recommendation of the Board of Publications a bylaw amendment was approved by the Board of Directors which changes the start of the term of office of the editor, business manager and publication staff to a term starting July 1 each year. (At the December 1987 section meeting the members also approved this amendment).

Education: The following motion was made and VOTED:
"Consistent with its enthusiastic support for the High School Chemical Education Program, and with gratitude to those who undertake its had work and in correction of a clerical error, the Board of Directors of the Northeastern Section of the American Chemical Society hereby awards an additional Honorable Mention in the 1987 Ashdown Competition."

Public Service: The board recognized the successful efforts of Phyllis Brauner, chairman of the Committee, and co-chairman of the Chemistry Day Committee in connection with the Chemistry Day activities. Valerie Wilcox coordinated the programs with the national ACS staff.

David M. Howell,
Secretary, Northeastern Section, ACS

Board of Directors Meeting

Northeastern Section ACS
December 3, 1987

Lloyd Taylor, Chairman, opened the meeting in the Norris Room, MIT, at 4:45 pm. The following members of the Board were in attendance: E.J. Billo, P. Brauner, M. Chen, A. Dey, T. Gilbert, W. Gleekman, M. Hearn, A. Heyn, E.A.H. Hopkins, D. Howell, T. Light, J. Perkins, J. Piper, D. Rickter, M. Simon, M.A. Solstad, L. Taylor, and V. Wilcox. Also attending was Robert F. O'Malley.

L. Taylor gave a brief report on Chemistry Day from his viewpoint. Governor Dukakis of Massachusetts and Governor Sununu of New Hampshire both issued proclamations for observance of Chemistry Day in their respective states. Copies of the proclamations will be placed in the Annual Report of the Northeastern Section. Letters of appreciation will be sent to the Governors.

The floor was opened to member suggestions as to Issues to be decided next year:

The matter of support for our Councilors/Alternate Councilors was raised again. J. Perkins observed that in a previous year the Trustees had tried to commit the section to support Councilors for both National meetings each year.

T. Light suggested that a workbook be issued to all Committee Chairmen and prospective Committee Chairmen so that they should know what should be done at appropriate times. D. Howell told the Board of the existence of Janice Fineman's workbook. However, this workbook was not distributed to the membership or to new Board members. Fred Owen of the Philadelphia Section was influential in obtaining a workbook for that Section over twenty years ago.

An election was held for the two Board Members to serve on the Nominating Committee. M. Hearn, T. Gilbert, M. Simon, and W. Gleekman were nominated. M. Hearn and T. Gilbert were elected to serve on the Nominating Committee. Dr. Taylor proposed a date of Jan. 21 for the first meeting of the Nominating Committee.

The Secretary, David M. Howell mentioned that the adventure into electronic minutes was continuing.

The Treasurer, James Piper, presented his report. It was accepted as read.

Board of Publications: Arno H.A. Heyn announced that, at the time of this Board meeting, there seem to be sufficient funds in the Publication Trust Fund to permit publication of a new Directory for the Northeastern Section in 1988. Although Mark Druy has one address for each member, a second one is desired—the missing home or office address. A mailing to the membership will have to be made to secure these addresses. Dr. Janet Perkins reported that as of 31 Oct., 1987, the Publications Income Account contained $2724 in cash and $6370 in investments, for a total of about $9000 available.

Janet S. Perkins and Myron S. Simon of the Trustees continued this discussion of the status of the Trust Accounts. 31% of the Trust Funds are in Stocks, 22% in Mutual Funds, and 46.7% in Bonds. Although the stock market averages have dropped about 24%, the values of the Northeastern Section Funds have dropped only 6%. The Board of Directors commended the Trustees for their prudent management of the Trust Funds.

Budget: James Piper reported that, as discussed at the previous meeting, Drs. Gilbert and Strem and Trustee Dr. Janet Perkins have been appointed by Lloyd Taylor to serve on the Budget Committee. A meeting is to be held within the month.

The Constitution and By-Laws Chairman, T.S. Light, will bring the Board of Publications Calendar Motion and the Motion regarding the Esselen Award to the December Meeting of the section at BC for a vote of the membership. (This is the Annual Meeting of the Section). Members of the Section who can not be present can help us obtain a quorum by submitting a written proxy before the meeting. Fifty members are needed for a Quorum.

Chemical Education: Michael Hearn took care of having the certificates signed as per the vote in the November meeting.

Hospitality: M. Chen reintroduced Katie Stygall, who will chair the committee in 1988.

Membership: vacant

Public Service: Phyllis Brauner reported first on the Chemistry Day observances at Framingham State College. Sessions were held for elementary and junior high teachers. Jerry Bell gave the keynote address. In the afternoon session which was open to the public, Dudley Herschbach gave a lecture and Bassam Shakhashiri presented his lecture demonstrations.

The Museum of Science program stressed Materials of the 21st Century. She then discussed the Christmas lecture planned for December 28 with two lectures! The Public Relations Committee has been working with the Public Service Committee to promote this celebration to the public.

The Speaker's Bureau Chairman, Mary Ann Solstad, reported that her speakers did a very successful series of presentations for Chemistry Day. W. Gleekman, a member of the Speakers Bureau, reported that he spoke to an auditorium full of students instead of the small student group that he originally expected.

Topical Groups:

Analytical: new chair to be annouced
Medicinal Chemistry: Richard Milius in 1988
Beer and Wine-Makers: vacant (group may be disbanded).
Retired Chemists: new Chair to be announced

NERM representative: Robert O'Malley reported on NERM 17. He then gave the projected future NERM schedule listed here:

1988 Orono, Maine, Aug 1–3

continued on page 14

ACS News

The Employee Educational Assistance Act of 1987

The "Employee Educational Assistance Act of 1987," was introduced early in 1987. It seeks to permanently extend section 127 of the IRS Code, which allows employees to exempt from gross income certain amounts of educational assistance received from an employer. Also included within section 127 are provisions that allow graduate teaching and research assistants to exempt from gross income stipends that they receive for teaching and research services performed at a university.

There are two key issues involved in the consideration of this Act. The first is the extension of the Act beyond its December 31, 1987, expiration. The second, involves the provisions regarding graduate students. Changes in the Tax Reform Act of 1986 have created confusion about the interpretation of the graduate student provisions within section 127. The IRS has begun to question the tax exemption for stipends given to graduate teaching and research assistants, while proponents for the Act's extension support the favored status for these students. During 1987 the following legislative proposals, which address these two issues, were introduced:

S.39 would permanently extend section 127, the Employee Educational Assistance Act. At this time, S.39 does not include clarification for graduate teaching and research assistants, but it is expected to be added as an amendment.

H.R.1692 would permanently extend the Act, and includes language to clarify the technical question concerning graduate students.

H.R.2636/S.1350, the Technical Corrections Act of 1987, was introduced so that technical problems arising from passage of the Tax Reform Act of 1986 could be corrected. An amendment has been proposed to clarify that graduate teaching and research assistant provisions should be interpreted as in the past.

H.R.3545, the House FY 1988 Budget Reconciliation bill, includes a provision which clarifies the technical question concerning graduate students. It does not, however, include an extension of the Act.

BILL STATUS/OUTLOOK: Despite broad support for the Employee Educational Assistance Act, it is unlikely that the Act will be extended prior to its expiration on December 31, 1987. However, if the Employee Educational Assistance Act is extended in 1988, the bill's sponsors will ensure that the extension is on a retroactive basis so that the law's provisions are not interrupted.

Prospects for passage of the technical clarification regarding graduate student provisions are better due to its inclusion in the Technical Corrections Act, and subsequently in the Budget Reconciliation bill. To achieve passage, the technical clarification must weather cuts made in the anticipated conference between the House and Senate. Still, without full extension of the Employee Educational Assistance Act, this relief for graduate teaching and research assistants will only be effective through the end of 1987.

ACS ACTIVITY: Over the past several years ACS has actively supported the continued passage of the Employee Educational Assistance Act (section 127, IRS Code). Oral testimony was presented in 1983, and written statements were submitted in each of the following years. The 1987 statement was submitted on July 17, 1987, to the House Ways and Means Committee urging their support for H.R.1692.

Under the direction of the Board Committee on Professional and Member Relations, whose members expressed concern over IRS activities that are having a negative impact on graduate students, the ACS Department of Government Relations and Science Policy has expanded its efforts to help get the technical correction approved to Congress. GRASP staff met with representatives from the Council of Graduate Schools (CGS) to discuss strategy. The Council is the chief proponent behind the proposal to include an amendment in the Technical Corrections Act that will clarify graduate student provisions under section 127 of the IRS Code. As a result, the Department then located ACS members concerned with the outcome of the graduate student provisions and urged them to contact members of the House Ways and Means Committee and the Senate Finance Committee, who would be considering the legislation, to solicit their support. The Department is continuing work with CGS to plan some concerted efforts on this issue for the next congressional session to open in January 1988. ◊

Dept. of Government Relations and Science Policy Legislative Programs

Estimating Average Salaries of Industrial Chemists

Each year, the ACS Office of Statistical Services conducts a survey to determine salaries and employment status of ACS members. The information gathered from these surveys is reported in *Chemical and Engineering News* and is published in detailed reports. In 1987 four reports were published: *1987 Salaries of Non-Academic Chemists, 1987 Salaries of Academic Chemists, 1987 Salaries of Non-Academic Chemical Engineers,* and *1987 Employment Status and Demographic Characteristics of ACS Members.*

A compact summary of the information in these reports is possible through a statistical technique known as multiple regression. This technique identifies which characteristics have the greatest effect on salaries, and results in a formula for estimating the average salary of respondents with certain characteristics.

For industrial chemists responding to the 1987 survey, the three characteristics which account for most of the variation among salaries are highest degree, experience (years since B.S. is used to measure experience), and work function.

Table 1 displays the factors needed to estimate the average salary for any group of respondents who are industrial chemists with any combination of the listed characteristics.

For example, to estimate the average salary in March 1987 for industrial chemists with the doctorate, 15 to 19 years of experience, and working in R&D management, find the corresponding factors in Table 1 and multiply them together with the base salary for all industrial chemists:

($23,714) × (1.297) × (1.645) × (1.206) = $61,018

If you have any questions regarding this formula or the salary survey publications, you may contact Joan Burrelli at 202-872-4433. ◊

SALARY FACTORS FOR INDUSTRIAL CHEMISTS

BASE SALARY	$23,714
DEGREE:	
Bachelor's	1.000
Master's	1.051
Doctorate	1.297
MATURITY:	
(Years Since Receiving B.S.)	
0–1	1.000
2–4	1.090
5–9	1.300
10–14	1.479
15–19	1.645
20–24	1.781
25–29	1.940
30–34	1.976
35–39	2.039
40 or more	1.910
WORK FUNCTION:	
Basic Research	1.000
R&D Management	1.206
Applied Research	0.985
General Management	1.174
Marketing	1.050
Production	0.909
Forensic/Lab Analysis	0.864
Writing	0.910
Data Processing	0.895
Consulting	0.974
Other	0.980

Nominations for Skolnik Award

In honor of the first recipient, the ACS Division of Chemical Information established the Herman Skolnik Award to recognize outstanding contributions to and achievements in the theory and practice of chemical information science.

The award consists of a $350 honorarium and a walnut plaque. The recipient is expected to give an address at the time of the presentation of the Award. The 1989 Herman Skolnik Award Symposium will take place at the 197th American Chemical Society National Meeting in Dallas on Tuesday April 11, 1989. In recent years, the Award Symposium has been organized by the recipient.

Nominations should include the nominee's contributions to the field, including supporting material, and an evaluation of the accomplishments. Seconding letters are required. The deadline for nominations for the 1989 Award is April 10, 1988. Nominations should be sent to:

Chemical Information Division
Award Committee
Merle I. Eiss
6800 Hunt Court
Baltimore, Maryland 21209

Laboratory Instruments Needed in Argentina

The Embassy of Argentina in Washington is interested in assisting universities and nonprofit research institutions in Argentina improve their capabilities in analytical chemistry. It would be glad to learn about instruments that might be donated for that purpose.

There is not the least doubt but that instruments in good operating condition become surplus in many laboratories in the U.S. The ACS as a national organization has established an extremely close working relationship with its counterpart in Argentina, the Argentina Chemical Association, and any assistance that the American chemical community can give to the Argentine chemical community is a very worthwhile undertaking.

Readers should contact the embassy for more information:

Mrs. Monica Peralta Ramos
Minister
Science and Technology Attache
Embassy of Argentina
1600 New Hampshire Avenue, N.W.
Washington, D.C. 20009
(202) 939-6400, -6401, -6402, -6403

Dept. of International Activities

TRINITY
COLLEGE

CHEMISTRY LABORATORY DIRECTOR

Trinity College (CT) Department of Chemistry invites applications for a newly created position of Chemistry Laboratory Director to begin July 1, 1988 pending approval of the College. Candidates should have a M.S. or B.S. in Chemistry. Primary responsibilities include: supervision of and instruction in the introductory chemistry laboratories and instructional support in the advanced teaching laboratories. Additional duties will include supervision of undergraduate student assistants, purchase of chemicals and simple apparatus and collaboration with the faculty in planning and executing changes in the laboratory programs. Applications from members of groups affected by affirmative action guidelines are invited. To apply send a resume, transcripts, and three letters of recommendation to Dr. Ralph O. Moyer, Jr., Chairman, Department of Chemistry, Trinity College, Hartford, CT 06106 no later than March 27, 1988. An AA/EO institution.

Board Meeting

continued from page 11

1989 Albany, NY
1990 Conn. Valley: Amherst, MA
1991 Syracuse?
1992 Binghamton, NY
1993 Northeastern Section's probable date??

The National Meeting of the ACS will be held in Boston in 1990. We should avoid sponsoring both NERM and National in the same year.

Arno Heyn reminded the membership of the Board that the January Meeting of the Board will be preceded by the Annual Meeting of the Board of Directors. Board Members should be prepared to give short oral presentations, as well as to submit a formal report for inclusion in the Annual Report of the Northeastern Section.

The meeting was adjourned at 6:30PM.

Respectfully submitted,

David M. Howell, Secretary

HEWLETT PACKARD

PRESENTS

GC/MS WORKSHOP

DATE: MARCH 29, 1988

LC WORKSHOP

MAY 6, 1988

TOPICS COVERED:

MASS SPECTROSCOPY THEORY
GC/MS
SAMPLING TECHNIQUES
GC INTERFACING
INSTRUMENTATION
PERTINENT APPLICATIONS

CHROMATOGRAPHIC THEORY
COLUMNS FOR LC
SOLVENTS IN LC
DETECTORS
METHOD DEVELOPMENT
SPECIAL TECHNIQUES

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Calendar

continued from page 16

Professor John Snyder (Boston University)
"The Structure of Bioactive Natural Products"
Boston University
Science Center Room 107 at 4:00 P.M.

Tuesday, March 22

Professor Rudolph A. Marcus (California Institute of Technology)
"Electron Transfer Reactions. Theory and Experiment"
University of New Hampshire/Iddles Lecture Series
Parsons Hall Room L-103 at 11:00 A.M.

Dr. Frank Maley (New York State Department of Health)
"Anatomy of a Chemotherapeutic Target Enzyme and its Gene"
Tufts University Health Science Campus
Sackler Building, DuBois Auditorium A at 4:00 P.M.

Dr. Emmanuel Ojadi (Southeastern Massachusetts University)
"Porphyrins: The Harvesting and Conversion of Light Energy to Chemical Energy"
Southeastern Massachusetts University
Science & Engineering Building
Room 305 at 11:00 A.M.

Wednesday, March 23

Dr. Michael Bowers (UC Santa Barbara)
"Reaction Dynamics of Small Ions and Ionic Clusters"
Harvard University
Mallinckrodt Room MB-23 at 4:00 P.M.

Monday, March 28

Professor Julius Rebek, Jr. (University of Pittsburgh)
"Model Studies in Molecular Recognition"
Boston University
Science Center Room 107 at 4:00 P.M.

Tuesday, March 29

Professor Cynthia Friend (Harvard)
"Mechanistic and Structural Chemistry on Molybdenum and Silicon Surfaces"
Massachusetts Institute of Technology
Room 4-370 at 4:00 P.M.

Dr. Brenda Shaw (University of Connecticut)
"Electrocatalysis"
Southeastern Massachusetts University
Science & Engineering Building
Room 305 at 11:00 A.M.

The Massachusetts Centers of Excellence Corporation
invites you to attend the

Polymer Science & Plastics Technology Symposium

Thursday, March 3, 1988
Sturbridge Sheraton Inn, Sturbridge, Massachusetts
8am–5pm

Over thirty speakers from local industries and universities will present current research projects in the areas of Advanced Polymer Materials, Polymer Manufacturing/Processing and Fabrication Technology, Biopolymers and Environmental Aspects related to Polymers.

Speakers include: Millipore, General Electric, Digital Equipment Corporation, Polaroid, Instron, Monsanto, Spire, GTE Laboratories, Typlax, University of Lowell, University of Massachusetts at Amherst, Massachusetts Institute of Technology, Northeastern University and others. Workshops by federal laboratories and state agencies will also take place.

Registration Fee: $40 for industry, government and academia.

For further information contact:
Frances A. Eagle, Polymer Science Project Director
Mass Centers of Excellence Corp., One Ashburton Place, Suite 2110
Boston, Massachusetts 02108
(617) 727-7430

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Calendar

For additional seminar information, call:
Boston University – (617) 353-2500
Massachusetts Institute of Technology – (617) 253-1596
Southeastern Massachusetts Institute – (617) 999-8246/8232
Harvard University (Chemistry) – (617) 495-4070
University of New Hampshire – (603) 862-1550

Tuesday, March 1

Professor Robert Vold (University of California, San Diego)
"NMR Studies of Higher Order Director Fluctuations in Liquid Crystals"
Massachusetts Institute of Technology
Room 4-370 at 4:00 P.M.

Dr. Susan H. Hixson (Mount Holyoke College)
"Photoaffinity Labelling of Enzymes with Bifunctional Aryl Azide Reagents"
Southeastern Massachusetts University
Science & Engineering Building Room 305 at 11:00 A.M.

Wednesday, March 2

Dr. R. Vold (UC San Diego)
"Nuclear Spin Relaxation and Molecular Motion in Clathrates"
Harvard University
Mallinckrodt Room MB-23 at 4:00 P.M.

Thursday, March 3

Dr. Clayton H. Heathcock (Univ. of California, Berkeley)
"Synthetic Inhibitors of HMG CoA Reductase"
Massachusetts Institute of Technology
Room 4-270 at 4:00 P.M.

Dr. Herschel Rabitz (Princeton)
"Making Molecules Dance: Optimal Control of Molecular Motion"
Dartmouth College
Steele Room 107 at 10:30 A.M.

Tuesday, March 8

Dr. Michael J. Davis (Argonne)
"Bottlenecks to Reactive and Intramolecular Dynamics"
Massachusetts Institute of Technology
Room 4-370 at 4:00 P.M.

Dr. Michael Green (Harvard University)
"Viral and Cellular Proteins that Regulate Adenovirus Transcription"
Tufts University Health Science Campus
Sackler Building, DuBois Auditorium A at 4:00 P.M.

Dr. Arthur Kesten (United Technologies Research Center)
"Catalyzing Propulsion"
Southeastern Massachusetts University
Science & Engineering Building Room 305 at 11:00 A.M.

Wednesday, March 9

Dr. Joseph Jasinski (IBM Yorktown)
"Silicon CVD One Step at a Time"
Harvard University
Mallinckrodt Room MB-23 at 4:00 P.M.

Thursday, March 10

Dr. Roger M. Freidinger (Merck, Sharp & Dohme)
"Design and Synthesis of Novel Antagonists of Cholecystokinin Based on the Natural Product Asperlicin"
Massachusetts Institute of Technology
Room 4-270 at 4:00 P.M.

Monday, March 14

Professor Paul Sigler (University of Chicago)
"Crystallography of the *trp* Repressor/Operator System"
Boston University
Science Center Room 107 at 4:00 P.M.

Tuesday, March 15

SYMPOSIA: Computers in Organic Synthesis

Dr. A. Peter Johnson (University of Leeds)
"ORAC: An Intelligent System of Indexing and Retrieving Organic Reactions"

Dr. William Jorgensen (Purdue)
"CAMEO: A Program for the Logical Prediction of Organic Reaction Products"

Dr. Kosta Steliou (University of Montreal)
"Drug Design and Synthesis"

Dr. Philip Fuchs (Purdue)
"Progress Toward the Development of a Robot Affected Totally Automated Organic Synthesis Laboratory

Dr. Alan Long (Harvard University)
"The State of the Art of Computer-Assisted Synthetic Analysis"

Worcester Polytechnic Institute
See ad on page 5.

Wednesday, March 16

Dr. C.B. Moore (UC Berkeley)
"Energy Flow in Unimolecular Systems"
Harvard University
Mallinckrodt Room MB-23 at 4:00 P.M.

Thursday, March 17

Professor George Cristou (University of Indiana)
"Synthetic Models of the Photosynthetic Water Oxidation Site"
Harvard/MIT Inorganic Seminar Series
MIT Room 4-370 at 5:00 P.M.

Monday, March 21

Professor Rudolph A. Marcus (California Institute of Technology)
"Unimolecular Reactions, Intramolecular Dynamics and Artificial Intelligence"
University of New Hampshire/Iddles Lecture Series
Parsons Hall Room L-103 at 4:00 P.M.

continued on page 15

THE NUCLEUS
Northeastern Section of the American Chemical Society
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