

President's Message

At BAS we have started to assemble a museum of electroanalytical chemistry. As I approach (and pass) the point where I'm twice the age of my students at Purdue, I'm impressed with how little they appreciate the speed at which electroanalytical chemistry has advanced. Many of these young people have never seen a Sargent Polarograph. Most were in diapers or less when Kuwana first played with spectroelectrochemistry, Osteryoung started pulsing, Anson and Reilley groups used micrometer-based thin layer cells, Bruckenstein was spinning, and Adams was distilling acetonitrile and mixing graphite with mineral oil laxative. Bard was still reviewing coulometry, Royce Murray was a chronopotentiometrist, and Dick Nixon was outside looking in on the Democrats.

I'm looking for junk, old prototype cells, electrodes, circuit boards, drawings, and the like. Those kinds of things often exist in the lower drawers under lab benches. If you'd like to share something with us, we need your best estimate of its date of origin and the names of the people associated with it. Some items which would be really helpful with the collection would be an early RRDE, an ancient micrometer and an ancient microscope slide thin-layer cell, a Philbrick tube op amp (a small one, not a whole manifold), an early Kuwana-type spectroelectrochem cell, etc. etc. We have a handsome display case for such things and you would be prominently acknowledged.

Since this is an editorial, it's only right to take a stand on politics. What (who) would be best for SEAC and electroanalytical chemistry? I clearly conclude that it would be Bush and Quayle and that's the way I'll play my lever. To have a Democratic Congress together with a Democratic Administration could put us at outrageous risk of more wasteful spending and higher taxes. In spite of the Dukakis rhetoric, life has improved for electrochemistry professionals these past 7 years. I say let's stick with what has been working! The Dukakis "Massachusetts Miracle" was a Defense Department exercise funded by Reagan. For Dukakis to take personal credit for this and simultaneously blast defense spending is outrageous. If he is elected, it won't be surprising if no military bases close in Massachusetts. Beware of Greeks in even numbered years.

Dr. Fred Hawkrige has done an excellent job putting together a first-rate Reilley Award symposium for the Pittsburgh Conference in Atlanta. We're planning a SEAC reception to honor Ted Kuwana. In addition, SEAC will hold its first Atlanta "Annual Meeting." Be there!

Pete Kissinger

EDITORIAL

Well, here we are at the third issue of the Newsletter since I became editor and the response to my pleas for input from the membership continues to fall on deaf ears, except for the same hard-core members who persevere in their efforts to keep the Newsletter informed. However, rather than continue to berate you for your lack of enthusiasm in supplying material, I have resolved henceforth to count my blessings for those items that are provided, but still hope that more of you will contribute to the cause (I sound like a TV evangelist, don't I? Maybe I should try raising money, it probably would be easier!).

I want to take this opportunity to personally congratulate Ted Kuwana for his selection as the 6th recipient of the C. N. Reilley Award of SEAC. He is certainly well deserving of this award, and I am sure that all his friends are looking forward to paying homage to him at this year's Reilley Award Symposium at PittCon. Fred Hawkrige has put together an excellent program (see details in this issue).

Since the President (of SEAC), in his message, takes a political stand, I should like to exercise my prerogative and provide an op-ed opinion on the upcoming election. While his point is well taken that life for the electrochemical professional has been reasonably good during the present administration, I prefer to look at the individuals up for election rather than policies or platforms which are, as you all know, just so much lip service to get elected and are, more often than not, forgotten when they take office. True, the administration has held down taxes -- but at what cost? Deficit spending outdid NASA in reaching new heights, even with Gramm-Rudman limits. And it can't be blamed entirely on the Democratic

Anomalous Electrochemical Behavior of the Methylmercury Cation

by Dick Durst

Congress. The administration-pushed defense spending was the major contributor. Of course, those of you (if there are any) who benefitted from SDI largess probably would not agree. But back to my main point: the individuals. Is there anyone out there who has heard the malapropisms of Bush and Quayle and is comfortable with the thought of these two leading the country? I'll leave it at that. Believe it or not, I'm usually a very apolitical person, but I just had to put in my two cents worth.

As I indicated before, I have included in this issue the first of what I hope will be a series of articles on observations of unusual electrochemical behavior. Since I'm sure almost all of you at some time or another have come across such phenomena, this will give you an opportunity to share it with the rest of us. This will serve several purposes: 1) entertain your fellow electrochemists, 2) stimulate thought, 3) provide answers to unexplained phenomena, 4) provide food for future Ph.D. research, and 5) hopefully lead to an exchange of ideas through the Newsletter. Let's have some fun with this!

As many of you know, Larry Faulkner is stepping down as Treasurer of SEAC and Frank Schultz has assumed those duties as of July 1st. I know that I am speaking for all of you when I express my sincere thanks to Larry for a job very well done. The Treasurer's Report in this issue is Larry's swan song as treasurer (also note that he left us in great financial shape), but I am sure that he will continue to contribute to the activities of SEAC in many ways. Thanks again, Larry.

Finally, if some of you may not have appreciated the subtle humor (or was it envy?), I just wanted to clarify that my article last time congratulating Fred Anson for his election to the NAS was written, except for the first and last paragraphs, with tongue-in-cheek. Those of you who know me know that I have very few serious bones in my body; so be sure to read between the lines of anything I write. (Some people will say that his also applies to my technical papers!)

Thanks very much to those of you who contributed to this issue; please keep up the good work.

Dick Durst

About a dozen years ago, as part of an investigation of mercury pollution, I observed something rather strange in the cyclic voltammetric behavior of the methylmercury cation. While I have since come up with one possible explanation for my observation, I never did follow it up with any definitive experiments; so the question of the phenomenon's cause is still unresolved. Now it's your turn. I welcome any and all questions, comments, criticisms, and explanations on the unusual behavior described below. Has anyone else observed this type of behavior before, with this or any other system?

Of necessity, I can only present a condensed description of the results of this study, but I think it is enough to convince you that the effect is real, or at least reproducible.

As background, it is generally accepted that organomercury compounds undergo two one-electron reduction steps, first to the organomercury radical and then to metallic mercury and the carbanion; although with radicals, any number of side reactions may occur depending on conditions. Two types of electrodes were used initially, glassy carbon and a hanging mercury drop. Since the carbon

electrode showed irreversible CV behavior for the methylmercury reduction (that is, until metallic mercury formed on subsequent cycles) all of the results described below were obtained with the HMDE. Some other very unusual behavior was observed during CV experiments with a rotating GCE. While interesting, the complexity associated with the irreversible behavior of methylmercury on carbon makes these results rather ambiguous, and perhaps I shall save that discussion for some future unexplained phenomenon column.

Of the hundreds of voltammograms run on the HMDE under a wide variety of conditions, several particularly interesting ones have been selected to illustrate the most significant results and the sensitivity of the electrochemical reactions to changes in the experimental conditions.

In one series of experiments, solutions of MeHgNO₃ in 0.01 M NaClO₄ were run at several scan rates (50, 100, 200, 500, 2000 mV/s), pH from 2.1 to 11.2, and cyclic potential scan from +0.1 to -1.7 V vs. SCE (except where hydrogen ion reduction interfered). The pH was adjusted by the addition of HNO₃ purified by sub-boiling distillation or high-purity NaOH.

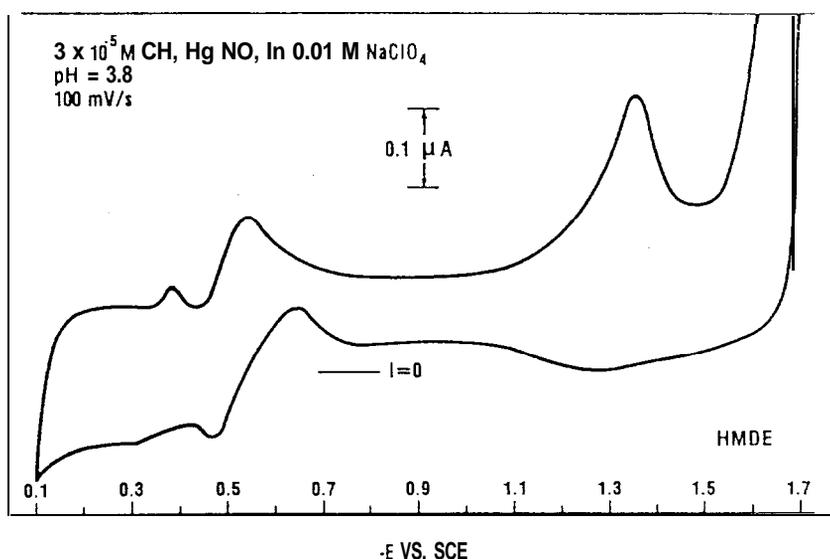


Figure 1. Cyclic voltammogram in acidic medium on the hanging mercury drop electrode.

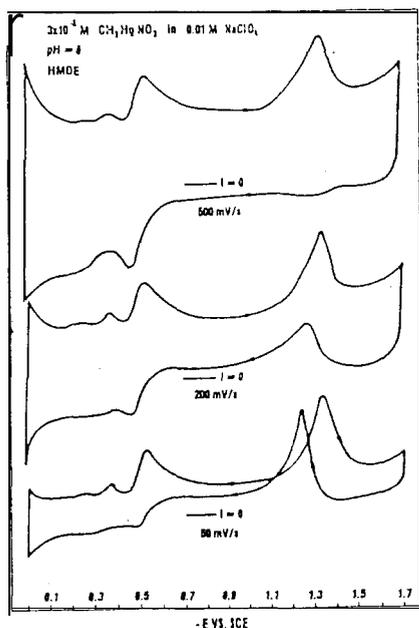


Figure 2. Variations in cyclic voltammograms caused by changes in scan rate.

Since the solutions were not buffered (in order to avoid interactions, e.g., complexation, adsorption, etc., with buffer anions), the voltammograms in the neutral region may be subject to significant pH variations in the vicinity of the electrode surface during redox processes involving hydrogen ions.

In general, one type of voltammogram was observed at pH values lower than about 4, another type at pH greater than 6, and very interesting but poorly reproducible effects in the intermediate pH region.

In the pH < 4 region, voltammograms of the type shown in Figure 1 were observed. Both reduction peaks were observed (ca. -0.5 V and -1.3 V vs. SCE) during the cathodic scan. A prewave (sometimes a doublet) was usually observed before the first reduction peak. The size of the prewave was time dependent and is probably caused by slow adsorption of the cation. During the reverse scan (anodic), a reduction "hump" was sometimes observed in the region between -0.5 and -0.8 V. At higher scan rates, a small oxidation peak occurs at ca. -0.45 V, corresponding to the expected oxidation of MeHg. to the cation, MeHg⁺.

In the neutral-to-basic range (pH 6-12), the most significant difference is the appearance of a very pronounced

"reduction" peak at about -1.2 V during the anodic scan (Figure 2, 50 mV/s scan). This "inverse" peak is very dependent on the methylmercury concentration, scan rate (decreasing with increasing scan rate as shown in Figure 2), surfactants (disappears upon addition of Triton X-100), and only appears when the second reduction step has occurred. The height of this peak is poorly reproducible even under virtually identical experimental conditions, which further complicates its interpretation. The only other differences between the basic and acidic cyclic voltammograms are the disappearance of the "hump" and a shift in the potential of the first reduction peak to more negative values as the pH is increased. This shift is consistent with the formation of hydroxyl complexes with the methylmercury cation.

One other experimental parameter which has an enormous effect on the cyclic voltammograms is the methylmercury concentration. Above 10⁻⁷ M, there appears to be much more interaction between the reactants, products and electrode surface which produces considerable "fine structure" in the form of peak doublets and higher-order multiplets, especially at potentials more negative than -1.0 V vs. SCE.

In the intermediate pH range, there is a considerable amount of peak formation, disappearance, shifting, doubling, and blending which defy a unified description. The only peak which shows reasonable stability at all pH values and most other operating conditions is the first reduction peak. However, even this peak shows a shift to more positive potentials as the concentration of methylmercury is increased.

Finally, to summarize the cyclic voltammetry results, it appears that the first reduction step is reversible on a mercury electrode at high scan rates. The second reduction peak is "usually" larger and sharper (less tailing) than the first reduction peak indicating some adsorption character along with perhaps catalytic or other regeneration of the electroactive species. The "inverse" peak observed during the anodic scan is highly dependent on kinetic factors and appears to be an electrode surface phenomenon involv-

ing the formation of a new electroactive species or a desorption process.

Well, for what it's worth, that's it. This is where I would normally provide some sort of lucid, profound, kinetic-mechanistic interpretation of the results. However, now it is your turn. Don't be timid; have a go at it. Granted, you probably have more questions at this point than answers. But give it a try. Write me, phone me, corner me at some meeting, but let me hear from you no matter how crazy your ideas may be. If you want to remain anonymous, that can be arranged. I'd really like to hear what you think is going on, and I'm sure others would, too. Maybe this will turn out to be so trivial that I'll look the fool, but, hey, it won't be the first time!

TREASURER'S REPORT

Society for Electroanalytical Chemistry

FISCAL YEAR 1988

July 1, 1987 - June 30, 1988

The Society's financial strength continued to grow in the fiscal year just ended, even while we attempted to do more for our membership. Attached to this report are a statement of income and expense and a balance sheet. Comparisons are made in both with the advisory budgets that were adopted previously by the Board of Directors.

We closed the year with a total net worth of more than \$17,000, and with growth in net worth of almost \$5,500. Much of the growth in net worth arose from our deliberate building of the Reilley Endowment and from the election of some of our members to purchase life memberships, the proceeds of which are held in an endowment account. However, some of the growth is attributed to expenses that fell under budget.

The Reilley Endowment grew to almost \$10,000 from a value of about \$6,800 at the beginning of the year. The endowment is now split between a 7.5% one-year certificate-of-deposit at Champion Federal Savings of Champaign, Illinois, and our interest-bearing checking account at Lafayette National Bank. This growth occurs mostly from our policy of adding one

third of collected dues to the Reilley Endowment, but there are significant direct contributions as well. We are in an excellent position to further the growth of the Endowment to a figure of \$15,000-\$20,000 within the time before the Award must become self-supporting. We still have five years for that effort, and we can expect growth to about \$12,500 in the next fiscal year.

The dues increase in the current year was imposed so that the Society could offer more to its membership. The budget for the Newsletter was enlarged by 50%, and the resulting increased size and frequency of the Newsletter has surely been noticed by all of us. Likewise, the budget for the reception at the Pittsburgh Conference was increased to allow for a more substantial event. The turnout of our members there was excellent, so this event seems well on the way to being an important time, annually, for us to get together and to interact.

Membership expenses were unusually large because there were several mailings related to changes in the Bylaws. Similar expenses are not expected in the coming year.

The Pittsburgh Conference continues its support of the Reilley Award Symposium by providing us with an annual contribution of \$2,500, and BAS is continuing its underwriting of the Reilley Award honorarium of \$1,000. These items are shown below as "Working Fund Contributions."

It is time now for me to pass the books to Frank Schultz, who took over as Treasurer on July 1. It has been a pleasure for me to have served the SEAC membership in this post since the time when our net worth was zero. We have truly become a substantial organization in the five years of our existence, and I believe that we are now able to do quite a lot for our profession. During most of my service, especially during the most intense parts of it, SEAC's financial business received considerable attention from Jane Daehler in my office and from Candice Kissinger in Lafayette. They deserve a public acknowledgment and sincere thanks.

Respectfully submitted,

Larry R. Faulkner July 28, 1988

INCOME STATEMENT

FISCAL YEAR 1988

July 1, 1987 - June 30, 1988

INCOME		
ACCOUNT	BUDGETS	ACTUALS
Interest-Checking	237.48	374.64
Interest-CD	515.00	532.70
Endowment Contrib.	0.00	549.50
Work Fund Contrib.	3,500.00	3,510.00
87 Dues	549.96	560.00
88 Dues	4,800.00	4,626.40
89 Dues	0.00	20.00
Life Dues Pavments	1,200.00	1,737.70
(Totals)	10,802.44	11,910.94
EXPENSE		
ACCOUNT	BUDGETS	ACTUALS
Symposium Expense	3,500.00	2,879.47
Reilley Awd. Exp.	1,700.00	1,870.65
Membership Exp.	550.00	810.35
Newsletter Exp.	1,200.00	859.28
Misc. Expense	50.00	10.00
(Totals)	7,000.00	6,429.75
(NET)	3,802.44	5,481.19

BALANCE SHEET

FISCAL YEAR 1988

July 1, 1987 - June 30, 1988

ASSETS		
ACCOUNT	BUDGETS	ACTUALS
Working Fund	2,344.00	3,131.85
Reilley End-LNB	1,183.84	1,915.23
Reilley End-Champion	8,015.00	8,032.70
Life Mem Endowment	3,930.75	4,073.00
(Totals)	15,473.59	17,152.78
LIABILITIES		
ACCOUNT	BUDGETS	ACTUALS
Newsletter Payable	0.00	0.00
Member Exp Pavable	0.00	0.00
(Totals)	0.00	0.00
(NET WORTH)	15,473.59	17,152.78

CHARLES N. REILLEY AWARD SYMPOSIUM SUMMARY

Sponsored by

The Society for Electroanalytical Chemistry

Organized by Fred M. Hawkrigde, Virginia Commonwealth University

The symposium will continue a six-year tradition of very well attended symposia honoring a highly productive electroanalytical chemist. The award recipient is Theodore Kuwana, Director of the Center for Bioanalytical Research and Regents Professor at the University of Kansas. Professor Kuwana will speak on his extensive achievements in the area of bioelectrochemistry, one area of research for which he is being recognized. Following Professor Kuwana will be William R. Heineman, Distinguished Research Professor of the University of Cincinnati. Bill Heineman was a postdoctoral with Ted Kuwana. He will present a talk on his pioneering work in the coupling of electroanalytical methods with immunoassay procedures in the detection of sub-attomole quantities of analyte.

The third presentation will be by Adam Heller of the University of Texas. He has recently developed synthetic strategies for incorporating redox mediators within the fabric of an enzyme, glucose oxidase. This achievement permits the direct electron exchange between native glucose oxidase and electrode surfaces, a development of substantial practical importance. Ted Kuwana was an early leader in the field of bioelectroanalytical chemistry. Next, Nicholas Winograd, Evan Pugh Professor of Chemistry at Pennsylvania State University, will talk on the development and application of surface spectroscopic methods in solving problems in inter-facial electrochemistry. Nick Winograd was among the first to develop this area of research, an area he moved into following his Ph.D. work with Ted Kuwana.

The final talk will be presented by Professor Ralph N. Adams of the University of Kansas. He was the recipient of the Charles N. Reilley Award in 1985 and he was the Ph.D. mentor of Ted Kuwana. Ralph will talk

about his group's current work in the area of *in vivo* studies of brain chemistry using electroanalytical methods with carbon fiber micro-electrodes, an area of research that he founded.

Biography of Theodore Kuwana

Theodore Kuwana of the University of Kansas is the sixth recipient of the C. N. Reilley Award in **Electroanalytical Chemistry**. Professor Kuwana is being recognized for his extensive achievements in developing the fields of spectroelectrochemistry, **bioelectroanalytical chemistry** and chemically modified electrodes.

Ted Kuwana was born in Idaho Falls, Idaho, in 1931. He received a B. S. degree in Chemistry from Antioch College in 1959, an M. S. in Chemistry from Cornell University in 1956 and his Ph.D. in 1959 from the University of Kansas under the direction of Professor Ralph N. Adams. Following a postdoctoral with Professor Fred C. Anson at California Institute of Technology, he joined the faculty at the University of California at Riverside as a Visiting Assistant Professor in 1960. He moved to Case Western Reserve University in 1965 as an Associate Professor and was promoted to Professor in 1968. In 1971, Professor Kuwana moved to Ohio State University as Professor and he returned to the University of Kansas as Regents Distinguished Professor of Pharmaceutical Chemistry and Chemistry and as the Director of the Center for Bioanalytical Research in 1986.

Professor Kuwana's research has included the development and application of the theory, methods and instrumentation for the field of **spectroelectrochemistry**. He has also made fundamental contributions to research areas involving bioelectroanalytical

chemistry, chemically modified electrodes and electrocatalysis. He has published over 150 research papers, received two patents and edited a three volume set, "Physical Methods in Chemical Analysis."

Professor Kuwana received the 1985 Distinguished Scholars Award of the Ohio State University, a Professional Leave from the Ohio State Special Programs for research and study in Japan in 1984-85, a Japan Society for the Promotion of Science Visiting Professorship at the Pharmaceutical Institute of Tohoku University, Sendai, Japan, in 1977, and an NIH Special Postdoctoral Fellowship for study at the Institute for Enzyme Research at the University of Wisconsin in 1978-71. He is a member of the Advisory Committee for the Chemistry Division of the National Science Foundation (1986-89), was an Associate Editor of Analytical Chemistry (1985-86) and he has been on the editorial boards of Accounts of Chemical Research (1982-86) and Analytical Sciences (1985-87), the International Journal of the Japan Society for Analytical Chemistry. He has served on several NSF and NIH review panels.



DIVISION OF ANALYTICAL CHEMISTRY SUMMER INTERNSHIP PROGRAM

The ACS Division of Analytical Chemistry is again seeking applicants and positions for the 1989 summer internship program. This program is aimed at introducing talented undergraduates to modern analytical chemistry. Students chosen to participate will be employed by industrial, government, or academic laboratories, where they will carry out various phases of fundamental or applied research. Participating laboratories agree to hire one or more students

during the summer. Applications are screened and evaluated by the division's Professional Status Committee. Applications and reference letters of qualified students are sent to several participating laboratories. These organizations then select the individuals most suited to their needs. The Professional Status Committee acts as a broker, soliciting applications from students and positions from laboratories. Salary and details of employment are negotiated by the organization and the student.

SEAC members are in an excellent position to participate in this program, by either agreeing to hire one or more

students for the summer of 1989 or soliciting good students to apply to the program, or both. To qualify for the program, students must have completed a minimum of two years of college, preferably including an instrumental analysis course or its equivalent, and have an interest in analytical chemistry. Ideally, students should be attending a four-year college and be between their junior and senior years at the start of the 1989 summer. The Analytical Division will also accept applications from current graduate students in analytical chemistry and from college seniors graduating in 1989 who have applied to graduate school with the intention of majoring in analytical chemistry.

The deadline for receipt of student applications is February 15, 1989. Additional information, and application forms, can be obtained from

D. J. Curran, Chairman
Professional Status Committee
ACS Division of Analytical Chemistry,
c/o Department of Chemistry
University of Massachusetts
Amherst, MA 01003.

For the 1988 program, thirty-seven student applications were received which resulted in placing eleven students with nine organizations. Help us make 1989 another good year for this program !

Charles N. Reilley Award Symposium

sponsored by

The Society for Electroanalytical Chemistry

Tentative date: Wednesday, March 8, 1989

arranged by Fred M. Hawkridge
Virginia Commonwealth University

- 1:30 Introductory Remarks - FRED M. HAWKRIDGE
- 1:35 Presentation of **Reilley** Award to Theodore Kuwana
by PETER T. KISSINGER of Bioanalytical Systems, Inc.
- 1:45 Bioelectrochemistry: Reminiscing a Bit and Looking to
the Future - THEODORE KUWANA, University of Kansas
- 2:25 Electrochemical Immunoassay: Sub-attomole Detection
Limits - WILLIAM R. HEINEMAN, University of Cincinnati
- 2:55 Electrical Communication Between Chemically Modified
Enzymes and Sensing Electrodes - ADAM HELLER,
University of Texas at Austin
- 3:25 Recess
- 3:35 Perspectives on the Transition from Electrochemistry to
Surface Science, NICHOLAS WINOGRAD, Pennsylvania
State University
- 4:05 Recent Brain Studies with Carbon Fiber Electrodes -
RALPH N. ADAMS, University of Kansas

Also, for those of you planning to attend the SEAC Reception, it will be held in the Marriott Marquis Hotel. We recommend that SEACers try to stay in this hotel (so they won't get lost in the street following the reception).

NEW MEMBERS

Christie Allred, Ohio State University
Daniel C. Alsmeyer, Ohio State
University

A. M. English, Concordia University
(Montreal)

Yun Fang, City University of NY,
Queens College

George Gullbault, University of New
Orleans

John Helfrick, Jr., Georgia Institute
of Technology

Tokuji Ikeda, Kyoto University

Gregory McIntire, Sterling Research
Group

Kathleen O'Connell, Medisense, Inc.

Hue-Tang Tang, University of
Cincinnati

John Wheeler, University of
Cincinnati

ELECTROCHEMISTRY SYMPOSIUM: PRELIMINARY PROGRAM

FACSS 1988

Boston, October 30 - November 4, 1988

Monday, October 31 Modified Electrodes (arranged by Jim Cox)

Marcin Majda, et al. University of California	Cyclic Voltammetric and Chronocoulometric Detection and Investigations of Self-Assembling Monolayers and Bilayers at Interfaces
Andrew Bocarsly Princeton University	Cyanometal Complexes as Surface Derivatization Reagents: Microstructural Effects on Charge Transfer
Brenda Shaw University of Connecticut	A New Class of Electrodes Made From Modified Composite Materials
Vernon Neff Kent State University	Prussian Blue and Related Mixed Valence Hexacyanides as Ion Sensing Electrodes
Joseph Wang New Mexico State University	Voltammetric Sensors Based on Chemically Modified Electrodes
Terrence Tougas University of Lowell	Electrocatalytic Oxidations of Polyhydroxy Compounds at Silver Oxide Electrodes
James Cox Miami University	Development of Stable Electrocatalytic Electrodes Based on Inorganic Films on Glassy Carbon Surfaces

Tuesday, November 1 Bioelectrochemistry Symposium (arranged by Vern Neff)

Andrew Ewing, et al. Pennsylvania State University	Voltammetry of Catechols at Ultrasmall Carbon Electrodes
Anna Brajter-Toth University of Florida	On-Line Electrochemistry/Mass Spectrometry in the Study of Bioanalytical Problems
Richard Baldwin University of Louisville	Analytical Applications of Electrocatalytic Modified Electrodes
James Rusling, et al. University of Connecticut	Electrochemistry of Vitamin B ₁₂ in Water/Oil Microemulsions
David Curran University of Massachusetts	Some Chemical Reactions of Interest in the ECLC Determination of Catecholamine Neurotransmitters
Craig Lunte, et al. University of Kansas	Analytical and Biochemical Aspects of Flavonoid Electrochemistry
Karl Kadish University of Houston	Electrochemistry and Chemistry of Sigma-bonded and N-Substituted Iron Porphyrins

Wednesday, November 2 Advances in Spectroelectrochemistry and Electrode Surface Characterization (arranged by Marc Porter)

Richard McCreery Ohio State University	In-Situ Raman Spectroscopy of Carbon Electrode Surfaces
Nicholas Schlotter Bell Communications Research	Chemistry at Liquid-Solid Interfaces: Monitored by Raman Spectroscopy
David Allara Pennsylvania State University	Optical Techniques for Organic Thin Films
Curt Marcott Procter & Gamble	Infrared Spectroscopy of Adsorbed Proteins
Marc Porter, et al. Iowa State University	In-Situ Infrared Spectroscopy as a Probe of Surface Composition, Structure, and Reactivity
Vicky Hallmark, et al. IBM Almaden Research	Studies of Molecular Orientation at Metal Surfaces With Scanning Tunneling Microscopy
Hector Abruna Cornell University	X-Rays as Probes of Electrochemical Interfaces
Robert Corn University of Wisconsin	Second Harmonic Generation Studies of Chemisorption at Electrode Surfaces
Andrzej Wieckowski University of Illinois	Radio-electrochemistry at Single Crystal Electrodes/Characterization by LEED and Auger Spectroscopy
Dennis Evans, et al. University of Delaware	Voltammetric Detection of Photochemically Generated Free Radicals
Dan Buttry, et al. University of Wyoming	Microgravimetric Investigations of Adsorption at Electrode Surfaces

LETTERS TO THE EDITOR

Dear Dick:

Not to worry! The SEAC newsletter is read and is appreciated.

Yours,
Garry A. Rechnitz

P. S. Thanks for the plug!

Dear Dick:

Thank you, I guess, for your laudatory editorial about me in the last SEAC Newsletter. At first I worried that you'd been too clever at hiding your sarcasm so that readers would think you were serious. However, you cleared the air completely by your MIT vs. Caltech comparisons: No one over three could have doubted that you were kidding about that!

The Newsletter is looking good under your editorship. Keep up the good work.

Sincerely yours,
Fred Anson

Dear Sir,

With reference to the comment made by your President in his message in Volume 5, No. 3, July 1988 concerning the perceived "slippage" of electroanalytical chemistry in Europe over the last 10-15 years, may I be so humble to point out that this is certainly not the view held by most of us over here. One only has to look at the success of the Biennial meetings of the Electroanalytical Group of the Analytical Division of the Royal Society of Chemistry, first held at Chelsea College in 1979 and then subsequently in Cardiff; as well as the new series of meetings held in European countries which began with the "Electroanalysis n a h'Eireann" conference here in Dublin in 1986, that was followed by the "ElectroFinnAnalysis" conference in Turku this year, and which is to be held in Spain in 1990, if you also take into account the Heyrovsky Memorial Congresses and Discussions held regularly in Czechoslovakia, and the Matrafured meetings in Hungary, you should no doubt see that electro-

analysis is alive and well in this part of the world.

As someone who was a postdoctoral fellow in your country, albeit nearly 10 years ago now!, I know how strong and exciting the field of electroanalytical chemistry is there; but it is also true to say that many of your research groups contain quite a few scientists from the "auld sod," who do a lot to enrich your chemistry, as well as your culture. I would like to see more cooperation between respective research groups in the USA and Europe, and I have tried to foster this through links with Prof.'s Heineman and Halsall at Cincinnati and Prof. Wang at New Mexico State, who have kindly accepted some of my postgraduate students into their groups for periods of about six months on mutually agreeable projects. I hope that such exchanges can be maintained and that more means are found to further links between our two continents in this area.

Slainte
Dr. Malcolm Ft. Smyth
National Institute for Higher Education
Dublin

[Kissinger replies: My comments in the July editorial were directed toward the use of electroanalytical techniques in Europe and not toward the always enthusiastic academic practitioners of the art and science. It appears to me that we have gained ground in the application of electroanalytical techniques to fundamental things (redox reactions of transition metal complexes) and lost ground to spectroscopy in more mundane areas (anodic stripping). This is just an observation; I don't come to any conclusion from it other than to have great respect for spectroscopy and chromatography.]

KUDOS

SEAC member Mike Weaver of Michigan State University has been named the recipient of the 1989 David C. Grahame Award by the Physical Electrochemistry Division of the Electrochemical Society. This Award was established in 1981 to "recognize outstanding contributions to fundamental aspects of electrochemical science

and engineering." It is given biannually and Mike is the fourth recipient (previous winners: 1983 - Fred Anson (Caltech); 1985 - John Newman (Berkeley); 1987 - Adam Heller (Bell Labs)).

The Award letter states that Mike "should take particular pride in your early attainment of this recognition by your peers." Our congratulations for this fine honor!

Congratulations once again to Mark Wrighton of M.I.T. who has been elected a fellow of the American Academy of Arts and Sciences.

EMPLOYMENT

Faculty Position

The Department of Chemistry, University of Wyoming, invites applications and nominations for two tenure-track positions, one in inorganic chemistry and one in analytical chemistry. The positions may be filled at any level, and applications from both junior and senior scientists are welcome. The salaries associated with both positions are competitive, and that of one of the positions will be appreciably enhanced by funds available through an NSF EPSCoR grant. Minority and women candidates are strongly encouraged to apply. Send C.V., statement of research plans, and three letters of recommendation to Professor Derek J. Hodgson, Department of Chemistry, University of Wyoming, Laramie, WY 82071. An Affirmative Action/Equal Opportunity Employer.

Postdoctoral Position In Electroanalytical Chemistry

To conduct research on relationships between structure and electrochemical reactivity of transition metal complexes. The research will involve electrode reaction mechanism studies, Marcus theory correlations and inorganic synthesis. Salary: \$17,000-18,000 per annum. Available: January 1, 1989; sooner, if possible. Send curriculum vita and three letters of recommendation to: Professor Franklin A. Schultz, Department of Chemistry, Purdue University School of Science, Indiana University-Purdue

University at Indianapolis. Indianapolis, Indiana 46223.

Postdoctoral Fellowship

A postdoctoral fellowship involving electrochemical and spectroelectrochemical studies in halide melts is currently available. We are involved in UV-visible absorption, infrared, and Raman spectroelectrochemistry of solute species in molten salts. Instrumentation available includes a Model 273 PAR digital potentiostat, a Tracer-Northern diode array spectrometer a Digilab FTIR spectrometer, and two Raman spectrometers. Applications should be sent to Professor Gleb Mamantov, Department of Chemistry, University of Tennessee, Knoxville, Tennessee 37996-1 600.

BAS AND IMI WED

Bioanalytical Systems, the West Lafayette, Indiana, scientific instrument manufacturer, has acquired a controlling interest in Interactive Microware, Inc. of State College, Pennsylvania. Interactive Microware (IMI) is a 10 year old firm specializing in hardware accessories and software for personal computers used by laboratory professionals. IMI software is widely used by both spectroscopists and chromatographers and includes data acquisition, graphics, and data analysis products.

BAS and IMI have worked closely in the past and this new alliance will provide strengths in both marketing and R/D. Many SEACers have used products from both firms. Hopefully the marriage will provide some advantages in quality and service to these electrochemists.

NEW BOOK

Electroanalytical Measurements in Flowing Liquids. K. Stulik and V. Pacakova. 290 pp. John Wiley & Sons, 605 Third Ave., New York, NY 10016. 1987. \$77.95

Reviewed in *Analytical Chemistry* 60 (14), July 15, 1988, by Miklos Gratzl, University of Utah, Department of Materials Science and Engineering, Salt Lake City, UT 84112.

DEATHS

BARER, Manual M., 74, adjunct professor of chemistry, University of California, Santa Barbara and Los Angeles, July 9. Baizer received his Ph.D. from the University of Pennsylvania in 1940. He held research positions at Brooklyn College, New York Quinine & Chemical Works, and Monsanto Co. before moving to California. ACS recognized his pioneering work in organic electrochemistry with the Award for Creative Invention in 1976. His research led to the development of the Monsanto process for the preparation of nylon. He published articles in a variety of research areas, including opium alkaloids, fine chemicals, and oxynitration of benzene. He was editor of "Organic Electrochemistry: An Introduction and Guide." The third edition, coauthored by H. Lund, was being written at the time of his death. Joined ACS in 1939; emeritus member.

C & EN, August 15, 1988

SEAC POLITICS

Slate of Candidates for the Board seats opening in 1989
NOMINEES FOR THE BOARD OF DIRECTORS OF SEAC
Ballots will be mailed separately

C. MICHAEL ELLIOTT, Professor of Chemistry, Colorado State University

Mike Elliott received his B. S. from Davidson College in 1971 and his Ph.D. from the University of North Carolina, Chapel Hill, in 1975, where he studied with Royce Murray. He then went on to a postdoctoral appointment with James Collman at Stanford. Mike joined the faculty at the University of Vermont in 1977, then moved to Colorado State University in 1981 as Associate Professor. He became Professor of Chemistry in 1987. Mike has particular interests in chemically modified electrodes, photoinduced electron transfer processes, bioinorganic electron transfer chemistry, and electronically conducting polymers.

ROYCE ENGSTROM, Chairman and Associate Professor of Chemistry, University of South Dakota

Royce Engstrom undertook undergraduate study at the University of Nebraska, Omaha, where he completed a bachelor's degree in 1975. He then did doctoral research with Walter Blaedel at the University of Wisconsin, and was granted a Ph.D. in 1979. Royce proceeded directly to the University of South Dakota as Assistant Professor of Chemistry. He became Associate Professor in 1983 and subsequently was appointed Chairman, a post that he still holds. His research focuses on the relationship between electrode surface structures and electrochemical performance. He is active in developing new characterization techniques with high spatial resolution for application to his research.

PAUL A. KOHL, Supervisor of Advanced VLSI Packaging, AT&T Bell Laboratories

Paul Kohl attended Bethany College (West Virginia), where he completed a baccalaureate degree in 1974. He undertook graduate study with Allen Bard at the University of Texas, Austin, and received a Ph.D. in 1978. He joined Bell Laboratories immediately thereafter and has become Supervisor of Advanced VLSI Packaging. Paul was involved very early in the chemical processing of materials, including photoelectrochemical device processing of III-V semiconductors for light-wave devices. He also headed a thin film and surface analysis group before taking on his present responsibilities in 1986.

MARCIN MAJDA, Associate Professor of Chemistry, University of California, Berkeley

Marcin Majda is a native of Warsaw, Poland, and he received his early higher education at the University of Warsaw, where he completed a master's thesis with Professor Zenon Kublik. His doctoral work was done at Southern Illinois University with James Cox. He gained the Ph.D. in 1979, then went on to a postdoctoral appointment at the University of Illinois with Larry Faulkner. In 1982, he joined the faculty of chemistry at Berkeley, where he became Associate Professor in 1988. Marcin's research activities focus on chemically modified electrodes, particularly involving self-assembling systems.

MARK E. MEYERHOFF, Associate Professor of Chemistry, University of Michigan

Mark Meyerhoff undertook baccalaureate study at Herbert H. Lehman College of the City University of New York, where he received a B. A. in 1974. He then did doctoral research with Garry Rechnitz at the State University of New York, Buffalo, and was granted a Ph.D. in 1979. He continued briefly with Rechnitz as a postdoctoral associate at the University of Delaware before taking up a faculty appointment at the University of Michigan in 1979, where he became Associate Professor in 1985. Mark's research interests lie in electrochemical sensors, particularly in advanced potentiometric systems, and related chemical topics, such as enzyme-ligand conjugate binding interactions.

JOSEPH WANG, Professor of Chemistry, New Mexico State University

Joe Wang was educated at the Technion in Haifa, Israel. He received a B. S. in chemistry there, then completed a master's degree in 1974 and a Ph.D. in 1978 under the supervision of M. Ariel. For the following two years, he was a postdoctoral appointee with Walter Blaedel at the University of Wisconsin, then he moved in 1980 to New Mexico State University, where he has since become Professor of Chemistry. He serves as Chief Editor of the new journal *Electroanalysis*. Joe's research interests cover a broad spectrum of electroanalysis with emphases on clinical and environmental applications, stripping voltammetry, and LCEC.