

SEAC Newsletter

Volume 2, No. 1 February, 1985

NOMINATIONS FOR 3RD PROFESSOR CHARLES N. REILLEY AWARD IN ELECTROANALYTICAL CHEMISTRY

A national award in electroanalytical chemistry in memory of Professor Charles N. Reilley of the University of North Carolina is presented annually. The award is under the auspices of the Society of Electroanalytical Chemistry and is sponsored by Bioanalytical Systems, Inc. (BAS). The annual award recognizes an active researcher who has made a major contribution to the theory, instrumentation, or applications of electroanalytical chemistry. The award consists of a plaque and a check for \$1,000.00.

Nominations for the 1986 recipient should include a *curriculum vitae*, a description of the individual's significant contributions to electroanalytical chemistry, and two letters of nomination. Nominating material should be received at the following address by May 1, 1985.

Reilley Award Committee
SEAC
c/o Professor Dennis Evans
University of Wisconsin - Madison
Chemistry Department
Madison, WI 53706

Once an individual has been nominated, his/her nomination will be automatically maintained for a period of three years. If further supporting information becomes available, it is welcomed for a candidate file at any time.

HAPPY BIRTHDAY TO DR. IZAAK M. KOLTHOFF



Dr. Kolthoff recently celebrated his 90th birthday. We congratulate him and wish him many more enjoyable years. Even if we're off by a year, it's only a 1% relative error. Not too bad for polarography.

ELECTIONS FOR NEW MEMBERS OF SEAC BOARD OF DIRECTORS

In the recent election, three new SEAC members joined the Board of Directors: Henry Blount, Richard Buck and Mark Wightman. The composition of the Board is now as follows:

Stanley Bruckenstein	Theodore Kuwana
Henry Blount	Joseph Maloy
Richard Buck	Royce Murray
Dennis Evans	Janet Osteryoung
Larry Faulkner	Robert Osteryoung
William Heineman	Stephen Weber
Dennis Johnson	Mark Wightman
Peter Kissinger	

SYMPOSIUM ON APPLICATION OF INFORMATION THEORY TO ELECTROCHEMICAL EXPERIMENTATION 168th MEETING OF THE ELECTROCHEMICAL SOCIETY

Las Vegas, Nevada October 14-18, 1985

This Symposium will focus on the application of information theory to electrochemical experimentation. Emphasis will be placed on the use of information theory to aid and enhance electrochemical experiments. Substantial review papers or original papers on the theory of multivariate statistical methods, experimental methods using multivariate statistics, and the application of multivariate statistics to modeling and parameter estimation are welcome. Suggested topics include simulation techniques, signal processing methods, pattern recognition, and experimental design. Suggestions and inquiries should be sent to the Symposium co-Chairmen: S.P. Perone, Chemistry Dept. L-130, Lawrence Livermore National Laboratory, Livermore, CA 94550; or H. Silverman, Rohrbach Technology Corporation, 2200 Sixth Ave., Suite 833, Seattle, WA 98121.

SECOND INTERNATIONAL SYMPOSIUM ON DRUG ANALYSIS

Brussels, May 27-30, 1986. Inquires to Mrs. C. Van Kerchove at:

MRS. C. VAN KERCHOVE
c/o Societe Belge des Sciences Pharmaceutiques
Belgisch Genootschap Voor Farmaceutische
Wetenschappen
Rue Stevinstraat 137
B-1040 BRUSSELS
BELGIUM

Donald E. Smith, Professor of Chemistry at Northwestern University, died January 9, 1985 in Evanston.

For almost 25 years following his Ph.D at Columbia (under the direction of the late Willy Reimuth) and his appointment to the Northwestern University faculty in 1961, Don was a leader in the development of electroanalytical chemistry in this country. Unquestionably, his work in ac polarography was of exceptional quality; seldom has the progress of a new methodology been so clearly identified with one individual. He was a gifted theoretician and experimentalist and used both talents in developing ac polarography. In the 1960's he and his students solved the ac theory for most electrochemical mechanisms and demonstrated adherence to the theory in practical experimental systems. Don was a leader in using state-of-the-art electronics to design potentiostats. He and his N.U. colleague Donald DeFord collaborated on the design of the first electrochemical instruments to employ operational amplifiers. Their landmark work in the early 1960's has provided the fundamental basis for potentiostat design for over two decades.

In the 1970's Don developed Fourier-transform ac polarography, which dramatically reduced the amount of time required to analyze mechanistic electrochemical data and expanded capabilities of accurately measuring very rapid electron transfer reactions. His work attracted a steady stream of senior scientists to his laboratory.

Don was the recipient of many awards and honors. He received the 1980 Chemical Instrumentation Award from the ACS Division of Analytical Chemistry. He served on the Instrument Advisory Panel of Analytical Chemistry, the Editorial Board of Journal of Electroanalytical Chemistry, and was Chairman of the 1980 Gordon Research Conference on Electrochemistry. He was also a valued consultant to the Chicago District Food and Drug Administration for many years and received a citation from the Department of Health, Education, and Welfare for his role in computerizing analytical methods in the Chicago FDA Laboratory.

Don's professional contributions are chronicled in part in the preceding considerations and in the greater than 120 research articles he authored. However, it was his personal qualities and values that endeared him to the electroanalytical community. Don was a considerate person with a good sense of humor. He was probably the only person ever to digitize the output of a symphony to use as an electrochemical waveform. One incident serves to exemplify Don's thoughtfulness. He was awarded the 1980 ACS Medal at the Houston ACS meeting, and a reunion of his former students was organized by Kathy Bullock, who received her Ph.D. under Don's direction in 1970. Don amazed everyone by having a plaque to present to each of us, thanking us for our contri-

butions in making his award possible. His consideration of others was remarkable.

Don's fight against cancer over the past eight years provided an example to each of us of how to unselfishly live each day to the fullest. The positive outlook of he and his loving wife, Rosemarie, will long be remembered, and he will be missed.

The Editor

MEMBERSHIP IN SEAC

Any individual with an interest in electroanalytical chemistry is invited to join SEAC. Dues are \$10 for 2 years. Students are welcome, with dues of \$5 for 2 years. For an application, contact: Professor Janet Osteryoung
Dept. of Chemistry
SUNY at Buffalo
Buffalo, NY 14124

OPINION

SOME SUGGESTIONS ABOUT CV RESULTS

Many of us have increasing concern over the quality of electrochemical data being used by those who are non-specialists in the field. The problem seems not to lie in manuscripts which are primarily electrochemical in scope, because those manuscripts are normally refereed by electrochemically wise reviewers. Rather, manuscripts in which electrochemical measurements are ancillary to the main thrust of the work more often slip by reviewers who might not be able to pick up incorrect or sloppy electrochemistry. It might be helpful to some authors, reviewers, and editors to have a "bare bones" set of guidelines against which to evaluate certain kinds of electrochemical data. Recommendations about cyclic voltammetry (CV) measurements might be a good place to start. I noticed that a recent issue of a journal specializing in inorganic chemistry has 12 articles reporting electrochemical data, 11 of which involved CV studies.

Is it possible to provide editors, reviewers and authors a "checklist" for reporting CV criteria? In order to generate some feedback on this question, the Editor is willing to stick out his neck with the following recommendations:

Philosophy: The degree of rigor to be brought to an electrochemical problem depends on the focus of the work, in particular the importance of the conclusions reached electrochemically compared to the overall goals of the paper. Papers with a primarily electrochemical focus should be reviewed with the same degree of rigor as those submitted to specialty electrochemical journals. Simply put, the conclusions must be justified by the data, and reasonable sophistication concerning

the theory and practice of electrochemistry must be demonstrated.

More controversial is the quality of data expected for electrochemistry reported as being of ancillary interest, or simply in a supporting role to the main thrust of the work. The importance of cyclic voltammetry to these papers is a matter of individual judgement. No one reasonably expects that rigorous criteria and an in-depth investigation must be applied to the most incidental cyclic voltammetric investigations. Rather, we should ask: what can be done to ensure that the most obvious misinterpretations of electrochemical data can be caught even by reviewers who are non-experts? What can be reasonably and minimally expected of a synthetic chemist who has available only an instrument to do triangular scans, and who only wants to see if there is evidence for reversible change of the redox state of the compound?

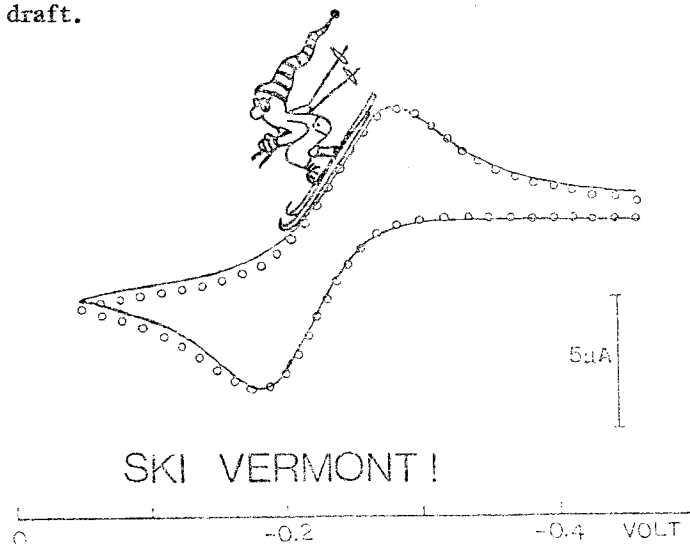
Some Suggestions about CV Results

These assume an investigator is attempting to show that a CV curve (often now given at just one scan rate) represents the reversible transformation of two forms of a redox couple by n -electrons.

1. Proof of Diffusion Control. Provide data on peak current measured as a function of scan rate, over at least one order of magnitude change in v . Comment on deviations from a constant value of $i_p \times v^{1/2}$. With normal pen-and-ink recorders, scan rates of 50-500 $\text{mv} \parallel \text{sec}$ are usually employed. There may be deviations from diffusion control at the lower end of the range because of convection in solution. Referencing $i_p \times v^{1/2}$ values against an internal standard (ferrocene?) could take care of the breakdown of semi-infinite linear diffusion.
2. What is the Electroactive Component? Confirm that the peak currents are proportional to concentration of the electroactive species (desired range of concentrations 10^{-4} to 10^{-3}M).
3. Peak Shape and Reversibility. The values of $E_p - E_{1/2}$ and ΔE_p (for a chemically reversible system) should be reported, along with the values of a one-electron standard (ferrocene is adequate). The standard should be at the same concentration as the test compound and ideally be an internal standard to adequately assure that the resistance effects are comparable on the waves of the standard and unknown. ΔE_p values should be reported over a tenfold difference in scan rate. The ratio of reverse-to-forward currents should also be reported over the range of scan rates to confirm the chemical reversibility.

4. Number of Electrons Transferred. Not easily attained by CV data unless charge transfer is reversible. However, the peak current can be compared with that of an internal standard which is expected to have a similar diffusion coefficient. If no suitable one-electron standard of similar size and charge is available, ferrocene may be employed so that at least the peak current ratio versus a known compound may be recorded. This ratio should be investigated over the scan rate range listed under point #1.
5. Reduction or Oxidation? It is not always easy to tell by CV if the test compound is in its oxidized or reduced form in the bulk of solution. To be sure, oxidations may occur at negative potentials and reductions at positive potentials. The direction of current flow should be confirmed by a steady-state measurement (e.g., voltammetry at a rotating platinum electrode, d.c. polarography, or stirred solution voltammetry).

We hope that these ideas stir some passions and that we can have a useful exchange of ideas on these or related topics. Please send ideas and criticisms (we are not accepting letter bombs) to the Editor. Thanks extended to a couple of electrochemists who had the good fortune to be able to offer suggestions in forming this first draft.



CONTRIBUTIONS SOLICITED

Please send symposium notices, position notices, gossip, opinions, etc., to:

William Geiger, Editor
SEAC Newsletter
Dept. of Chemistry
University of Vermont
Burlington, VT 05405

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BUFFALO IS ON THE WAY TO TORONTO!

SEAC members at SUNY Buffalo (Bob and Janet Osteryoung, Stan Bruckenstein) extend an informal invitation to those attending the Electrochemical Society meeting in Toronto this May. If your plans include travel through or near Buffalo, please stop by and accept our welcome before or after the meeting. Give us a call and let us know if you would like to visit:

Bob Osteryoung (716)831-3820
Janet Osteryoung (716)831-2513
Stan Bruckenstein (716)831-3011

POSTDOCTORAL POSITION

Postdoctoral position beginning between June and September, 1985, to work in the general area of electrocatalysis of organic redox reactions. Ph.D. in analytical or physical chemistry and experience in electrochemistry are required. Familiarity with computer data-analysis methods and micellar systems is desirable. Salary range \$16,000 to \$19,000 depending on qualifications. Send resume, and arrange for three letters of reference to be sent to: Professor James F. Rusling, Dept. of Chem. (U-60), University of Connecticut, Storrs, CT 06268. The University of Connecticut is an equal opportunity/affirmative action employer.

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