

# MACTLAC

MIDWESTERN ASSOCIATION OF CHEMISTRY TEACHERS IN LIBERAL ARTS COLLEGES



TO: MACTLAC Members

FROM: Office of the Secretary-Treasurer  
Wheaton College  
Wheaton, Illinois 60187

RE: 1982-83 Annual Report

May, 1983

## THE CORNELL COLLEGE MEETING - October 22-23, 1982

On a bright sunny autumn weekend, roughly 150 members and guests gathered on the hilltop campus of Cornell College in Mt. Vernon, Iowa for the thirtieth annual meeting of MACTLAC. The meeting was successfully organized and directed by the three Cornell chemists, Truman Jordan, Bill Deskin, and Addison Ault. The general theme of the meeting was Microcomputers and Chemical Education.

The Friday afternoon meeting began with brief welcoming statements from the President of MACTLAC, Dr. Wilmer Stratton and the President of Cornell College, Dr. Phillip Secor. Addison Ault then introduced the speaker for the session, Prof. Stan Smith of the University of Illinois. Dr. Smith described the Computer-Aided-Instruction System in use at his university. Included in his illustrations were General Chemistry programs on balancing equations and experiment simulations and Organic Chemistry programs on spectroscopy, reaction animation, and synthesis. He also demonstrated a novel "Star Wars" type game to teach reactions called "Chemrain."

Following this plenary session was a pair of discussion group sessions with a variety of topics for consideration. The afternoon ended with a facility tour and a microcomputer show which included a number of vendors showing their wares. In the evening we enjoyed a hearty banquet after which we were serenaded by two members of the Cornell music faculty.

On Saturday morning the program began with the Annual Business Meeting, the minutes of which are at the conclusion of this report. The second major speaker of the meeting, Dr. John Moore of Eastern Michigan University was then introduced. The title of his address was "The Electronic Chemistry Set: Teaching with Computers." He challenged us as chemical educators to play an increasing role in the development of the usage of the computer as an instructional aid. Following this plenary session, a third opportunity was given to engage in discussion on a variety of topics.

Several of the discussion groups assigned recorders who forwarded their reports to me. A summary of these follows.

### Analytical Chemistry Laboratory

Considerable discussion was generated on the following topics:

1. How much of an analytical chemistry course should be devoted to laboratory?  
(Consensus: 40-50%)
2. What should be emphasized for medical technology students taking an analytical chemistry course? (Consensus: Teach the basics of technique, data acquisition and data analysis. Later courses at medical technology school will cover specific techniques.)
3. Should electronics be included in an "Instrumental Analysis" course?  
(Consensus: Electronics is definitely needed in a chemistry major's training. If some other course does not cover it, Instrumental Analysis should touch upon it.)
4. How much should be taught on instruments in a beginning Analytical Chemistry course? (No definite consensus was reached. Many ideas were expressed. The group seemed to favor teaching an appreciation for and a knowledge of the capabilities of instruments as well as detailing their limitations. Simple spectrometry, pH, and electrogravimetry were suggested as legitimate topics.)
5. Do you use real samples in your lab, and if so, how do you evaluate them?  
(Consensus: Yes, many used the class mean as the correct value. Anyone within one standard deviation of the mean would receive a certain amount of credit, etc.)
6. The use of the Journal of Analytical Chemistry for homework assignments was described by John Ganchoff. He assigns questions over a journal's article. He also has a required report handed in. It has worked well for his classes.
7. Several schools give a lab practical exam dealing with reading burets and making accurate weighings soon after the semester begins for the purpose of pointing out problems early in the semester. Other schools require that an experiment be done that requires correct technique for accurate results. This fulfills the same purposes.

Unfortunately, time ran out before all items of discussion were resolved.

-John Ganchoff, Recorder

### Inorganic Chemistry Laboratory

Two sessions were held with 8 in attendance at each session. The participants introduced themselves and commented on the status of inorganic chemistry at their institutions. A number do not include laboratory with the inorganic course but were interested in knowing what others were doing. The discussion included incorporation of descriptive inorganic material in general chemistry as well as the laboratory of an upper level inorganic course. Participants shared some of their favorite experiments and gave references to source material. Other ideas that were discussed included:

- the study of oxidation states as a tool for organizing the study of inorganic chemistry,

- the need to find suitable experiments for mechanism and kinetic studies in inorganic chemistry,
- the problem of research taking precedence over inorganic chemistry courses, i.e., the inorganic labs get squeezed out of many student programs,
- the ACS certification requirement which places a great deal of emphasis on organic lab but not on inorganic lab,
- the use of a "Synthetic Tournament" to stimulate interest, i.e., the specific experiment used involved the conversion of old silver oxide to silver nitrate. Rating on time, yield, and purity were used to score the student participants.

-Sr. Mary L. Caffery, Recorder

### Physical Chemistry Laboratory

Group I - The discussion centered on source materials of experiments, criteria for choice of experiments. There was discussion on the demands of report writing and oral reports. Some novel experiments discussed were a new design of Guoy balance, rubber band thermodynamics, infrared experiment on reduction of ketones (kinetics) and hydrogen bonding.

-George Hardgrove, Recorder

Group II - The discussion in this session centered on Physical Chemistry Laboratory as a special topics course in which students were given a semester project or in which students were given a series of projects due at the end of the semester. Some formal write-ups were a part of almost every course. Some discussion centered on what type of experiment should be in the Physical Chemistry Laboratory - one that would be closer to what they would experience in graduate school or one where they learned to do something well or one that would give them a spattering of experiences. No clear cut solution to these latter questions evolved.

-Roger Lambke, Recorder

### Microcomputers in the Laboratory

Two sessions were held. Approximately 30 persons attended each session. John Zimmerman supplied a very helpful packet of information he had collected regarding interfacing accessories for various microcomputers. Each person in attendance described briefly what equipment was being used for on-line microcomputer applications at his/her institution and the kinds of on-line uses currently in operation or under development. Although KIM, AIM, TRS-80 and PET computers were mentioned, APPLE was by far the most widely used. The "Smartface" was mentioned as one commercial interface which was very appealing for use with various instruments. An A/D converter card from Interactive Structures which can be purchased with software for about \$550 was also mentioned. Several persons were using the ADALAB card and associated software which is available from Interactive Microware. Caution was expressed that the user should expect significant amounts of development time even when using fine commercially available hardware/software systems such as ADALAB. While these systems do make it much easier to implement desired systems, they do not eliminate all of the problems for the user.

One user of the AIM system had encountered difficulty with the preamps and A/D converter. Another user described how PET was being used with an Intel DVM kit at Bradley. An on-line system was described for a physical chemistry kinetics experiment in which conductivity data was collected under different conditions by various

students, the results pooled and the computer again was used for reduction of the pooled data. A system designed at Taylor was described for automating multiple standard addition analyses using ion selective electrodes and an Apple II Plus microcomputer.

Several persons were using on-line microcomputers to collect and store IR and UV spectra and do background corrections.

-Stan Burden, Recorder

### Values and Science

What value does a "fact" have in the education of the non-major? Responses:

- (a) Process is important but must make use of facts.
- (b) Emphasize relation between fact and theory.
- (c) Use historical cases to illustrate varied interpretation of "facts" - i.e., gas laws, DNA structure, the electron.
- (d) Stress use of models, i.e., thought constructs used to explain facts.
- (e) Science literacy requires knowledge of facts.
- (f) What is science literacy? Easy to define as a collection of "facts," need to recognize that scientists do not all agree on the interpretation.
- (g) Use "Ascent of Man" series as vehicle for presentation of scientific method.

Why use outmoded models?

- (a) Historical value in presenting progression of thought.
- (b) Use of such models is effective pedagogically.
- (c) Models useful to illustrate applied chemistry, e.g., why halogenated hydrocarbons accumulate in fat tissue.
- (d) Provides experience in evaluating scientific arguments, in learning whom to believe and when, in making decisions about science related issues.

What do we do to teach the "process" of Chemistry?

- (a) Open ended laboratories, one on one with the student--time consuming.
- (b) Case study approach from the history of science or a current situation.

Some questions raised at the end with minimal opportunity for discussion: Do we feel ill at ease with courses which focus on process rather than facts?

As chemical educators do we think in terms of values, history, etc? Are our majors exposed to the history of their discipline?

-Marvin Dixon, Recorder

GENERAL BUSINESS MEETING

Saturday, Oct. 23, 1982  
8:30 a.m.

1. President Stratton called the meeting to order.
2. The Secretary-Treasurer reported on the Executive Council Meeting of the previous day. Items mentioned included:
  - (a) The revision of the minutes of last year's meeting.
  - (b) A summary of the treasurer's report.
  - (c) Meeting sites for next three years.
  - (d) Actions taken by council: dues increase; Sec.-Treas. honorarium increase, dissolution of P.A.C.; failure of motion to increase meeting support level.

3. New state representatives were announced and introduced:

Michigan: Rhoda Craig, Kalamazoo  
Illinois: Harry Neumiller, Knox

The ongoing state representatives were also introduced.

4. Nominating Committee

Phillip Bays nominated Roger Lembke of Central Methodist College as President-elect. Opportunity was given for further nominations. It was moved and seconded that nominations be closed and Dr. Lembke be elected by acclamation. Motion carried.

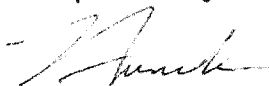
5. NEW BUSINESS

- (a) The Secretary-Treasurer presented the recommendation of the Executive Council that the By-Laws be amended to increase the annual dues to \$2.00 and moved its acceptance. The motion was seconded and carried.
- (b) L. Oliver Smith issued an invitation to the 1983 meeting at Valparaiso University and announced the dates of the meeting, Nov. 4 and 5. He also welcomed program suggestions.
- (c) The President noted the continuing activity of the Health and Safety Committee under the leadership of Richard Bayer. He also commented on the dissolution of the Political Awareness Committee and the role of Ida Wallace and CUR in providing part of the service previously performed by the committee.
- (d) Joe Rogers of PRF announced that applications for research grants from small colleges have diminished seriously and he encouraged applications from the MACTLAC membership.

- (e) John Crump moved an expression of sincere appreciation to the Cornell Chemistry staff for a well organized and successful meeting. Seconded and carried by applause.
- (f) John Crump moved that the Secretary-Treasurer write a letter of appreciation to the host institution expressing our appreciation. Seconded and carried.
- (g) Glen Frerichs moved that we show our appreciation to President Stratton for a job well done. Seconded and carried by applause.

6. A motion was made to adjourn. Seconded and carried.

Respectfully submitted,



L. Funck  
Secretary-Treasurer of MACTLAC