

MIDWESTERN ASSOCIATION OF CHEMISTRY TEACHERS

IN LIBERAL ARTS COLLEGES

May, 1982

TO: MACTLAC Members in good standing

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

RE: 1981-82 Annual Report

THE CARTHAGE COLLEGE MEETING - October 23-24, 1981

Carthage College of Kenosha, Wisconsin was the host for the twenty-ninth annual MACTLAC Meeting. Approximately 175 members and guests attended the meeting on a crisp, sunny weekend on the campus on the shore of Lake Michigan. The meeting was well planned and executed by Dr. Kenneth Hamm and his colleagues.

The Friday afternoon session began with a brief welcome from Dr. Hamm and Dr. Erno Dahl, President of Carthage College. This was followed by a major address by Dr. Alexander Karczmar, Co-Director of the Loyola Institute for Mind, Drugs, and Behavior. Dr. Karczmar discussed some recent developments in the field of neurochemistry.

At the evening session the speaker was Dr. Richard J. Terrile of the Jet Propulsion Laboratory, Pasadena, California. The conferees were suitably impressed by the spectacular photography and computer simulated motion pictures of recent NASA space exploration.

Our speaker on Saturday morning was Bassam Shakhashiri of the University of Wisconsin on the topic, "Additional Ways to Incorporate Descriptive Chemistry in Undergraduate Courses." Among his suggestions were: chemical of the week, inclusion of descriptive chemistry in the laboratory, and, of course, lecture demonstrations, some of which Bassam performed for us.

Interspersed on Friday afternoon and Saturday morning were a variety of discussion groups. Recorders of several of the groups forwarded to me reports of these sessions and what follows is a summary of these.

RESEARCH FUNDING

Jim Swartz presented information concerning NSF Science Education funding from Karen Davis of the Independent Colleges Office.

NSF budget is tacked on the HUD and Independent agency funding bill - passed House and Senate - compromise bill passed by House - not yet scheduled for Senate. Senate is waiting on negotiations with administration on further spending reductions. This bill is way over administration request and will probably be vetoed if prior compromise is not reached. It provides 27.5 million for Science Education (\$15 million for graduate fellowships and \$12.5 million for the rest of the programs - not specified in bill). The Independent Colleges Office has suggested they accept proposals in 3 broad categories: personal, instrumentation, and curriculum and that widely differing proposals be allowed to compete in those categories. URP would not be a separate category but lumped in with personnel.

Research Equipment for two and four year colleges was specifically mentioned in several appropriations and authorizing committee reports, and is likely to survive at approximately 1981 levels (after budget revision, 2.8 million). Howard Hines, the director, is accepting proposals and giving them a screening. Proposals which would not have been funded in 1981 are being rejected, and those which have a chance of funding are being sent out for review. When the funding situation is clear, a review panel will be convened or the proposals will be passed on to the appropriate research equipment directorate.

NSF is correctly operating on authorization which funds it at 1981 levels through November 20, but the administration had requested that agencies not spend any more money than necessary prior to specific congressional appropriation. If no compromise between Congress and the administration occurs, it is possible that funding at 1981 levels could be extended for the entire fiscal year. This, however, is unlikely.

Science Education is likely to survive, but at drastically reduced levels. It will be necessary for us to lobby our legislators to boost the program to reasonable funding levels in coming years.

Brian Andreen discussed the availability of funding from ACS-Petroleum Research Fund (Type B) and from Research Corporation. The overall funds available from both programs has been on a gradual increase. The success rate with PRF is on the order of 40-50% and 50-60% for Research Corporation.

Several participants indicated that they had been successful in soliciting alumni and/or chemical industry for summer research or equipment funding. The importance of the quality of writing in proposals was also stressed. It was suggested that draft proposals be sent to colleagues, Ph.D and Postdoctoral mentors or potential reviewers prior to submission.

Jim Swartz

#### POTPOURRI

The discussion group numbered 10 intrepid souls who grappled with issues ranging from "How do we know what we know in science?" to "How do we explain the fact that air-filled soap bubbles expand when they move from a warm air experiment to a cold CO<sub>2</sub> environment found in the neighborhood of dry ice?"

The rewards, trials and tribulations, and textbook problems related to teaching courses for "non-scientists," particularly physical science courses and chemistry courses for elementary education majors, were discussed.

Experiences with courses that explore the impact of science on the human condition were shared by two or three individuals in the group.

The issue of the faculty member as professor (professional in his subject matter) vs. the faculty member as teacher (in the sense of being non-professional in the subject matter) was briefly debated.

Finally, Dick Ramette left us all scratching our heads trying to explain on the basis of molecular behavior how it is that a helium filled balloon and a carbon dioxide filled balloon each tethered inside an automobile, respond differently when the automobile is accelerated.

-Charles Carlin Recorder  
-Irwin Brinks Convener

INSTRUMENTAL ANALYSIS - Who is doing what in lecture and the laboratory in the 1980's

Two sessions were held, 37 present in the first and 12 in the second. In both sessions each person described the analytical chemistry course (time for lectures, laboratories, if yearly or alternate year) at his or her college. Almost all have one or two 3-hour labs per week and some have Apple computer simulated labs. The group discussed the problem of surveying many instruments or studying a few in depth. The topics selected are often made according to the equipment available at the particular school. Instrumental analysis has grown so large in the last few years that just mentioning the new evolving methods when the equipment is not available is about all that can be done. The students need a basic background to understand the sophisticated equipment.

The difficulty of choosing a text was discussed; most text books do not have much interpretation, but rather more on the function of the instrument. Also, there is the question of too much electronics or too little? Are we emphasizing chemical instrumentation or just instrumentation? What is the happy medium? A separate course in electronics? Also discussed was the idea of a MACTLAC Lab Manual--it was felt that the merit would be in the sharing of the experiments in the original form to keep the items current and to have a rapid exchange of ideas. A printed lab manual would be too time consuming and would probably be out of date before it was ready. The use of films was discussed and it was felt that they add meaning if used wisely. Another method of keeping current is to arrange for an instrument sales demonstration on campus for the students (this keeping current is good for both the student and the faculty). The matter of interfacing was discussed and automated analysis--where does this leave the thinking of the student in an analytical problem?

-Anne Sherren      Convener  
 (Condensation of two reports by  
 Pat Fish and Alan Childs.)

GENERAL CHEMISTRY

Approximately 50 were in attendance. The discussion began with texts for general chemistry courses with perhaps one third indicating they are using the 5th edition of Masterton and Slowinski while the rest were spread among many other texts. The reasons for preferring various texts ranged from arrangement of material to quality of problems, level and selection of material, correlation with laboratory work, and readability. On that last point, one suggestion was to use sophomore students to review sample chapters of any text under consideration to see how they react to its readability.

For laboratory work, approximately one third use a published lab manual with the rest producing their own materials. The discussion then digressed for awhile into the area of legal liability of authors and instructors in laboratory situations, whether colleges have liability insurance to cover such possibilities, and the availability of liability insurance through the ACS.

A recurrent theme was the life cycle of texts as they progress through various editions, some retaining their essential vitality through many editions while others evolve in directions that lose their past audience.

-Bassam Shakhshiri      Convener  
 -Brock Spencer            Recorder

ORGANIC CHEMISTRY

There were 43 in attendance. Laboratory occupied most of the discussion. The time required for organic lab ranges from 50 hours over one semester to almost 150 hours over two terms. There was no sentiment for elimination of laboratory in spite of difficulties in teaching it and its high cost. Some institutions give lab and lecture as separate courses. Others offer lab only after one term of lecture is complete. This allows greater sophistication in experiments offered but limits the possibility for integration of theory and experiment or supplement of lecture material by concepts introduced in the lab. The question of lab practical exams was asked and the response was that they were little used and generally with negative results.

Qualitative organic was discussed at length. Most include it in the regular course, a small minority offer it separately. Many argued that the use of wet techniques offered a better learning experience than the use of spectroscopy, since the latter makes the identification of unknowns too facile. A few participants noted their use of computerized qualitative organic labs before or during the actual lab work.

The use of computers in organic was discussed briefly. One person described the use of graphics of cyclohexane conformations and Fischer projections.

On textbooks, only three seem to have found wide usage - Morrison and Boyd, Solomons, and Streitweiser and Heathcock. It was opined that the latter offered a unique alternative but requires a more careful teaching effort and more conscientious attention from the students.

Finally, there was brief consideration of spectroscopy in lecture. Generally only 2-3 lectures or 7-8% of the course is devoted to this topic with virtually nothing on  $^{13}\text{C}$  NMR.

Jerry Mohrig	Convener
Garry A. Spessard	Recorder

PHYSICAL CHEMISTRY

About 35 people attended this group discussion, and most contributed remarks at one point or another during the session.

The chairman polled the group on various items, with the following responses:

1. Physical Chemistry text currently used: Atkins, 6; Barrow, 4; Levine, 3; Adamson, 3; Castellan, 2; Alberty and Daniels 2; Bromberg, 1; Moore, 0; Berry, Rice and Ross, 0.
2. Offer special courses in physical chemistry for students in the health sciences: 4.
3. Use ACS examinations in testing: 10.
4. Laboratory an integral part of the course: 25;  
No laboratory, or laboratory optional: 4.
5. Laboratory manuals currently used: Shoemaker, Garland, et al., 6; Daniels et al., 3; Crockford et al., 1; White, 0; MACTLAC (Oelke), 0; handouts or oral instruction, 6.
6. Require fairly full laboratory reports: 14.

Most of the discussion centered on the nature of the laboratory course. It was evident that most of the laboratories still incorporate rather traditional experiments, such as bomb calorimetry (10), phase diagrams (16), determination of heat of vaporization of a liquid (14), etc. A substantial number include some quantum experiments (such as measurements on the IR spectrum of HCl), but only 2 indicated use of a computer for data taking (more for data analysis), only one laboratory reported use of a laser, and only one a temperature jump or stopped-flow kinetics experiment. Most participants felt the need for an updating of their laboratory courses but felt hampered by the lack of wherewithal to purchase the necessary expensive instrumentation.

-Luther Erickson            Convener  
-Jack Coutts                Recorder

### MODELS

Dr. Olaf Larson demonstrated various types of models which he has developed. Among the items he showed were printed pi-bond patterns stapled to plastic double bond units to show the orbital symmetry in benzene and pi-orbital extensions of conjugated systems. He traced the development of his "paper stereomodels" including the widely used "tetrahedral fold." He led the group through the student exercise of folding a paper with four pyranose rings printed on it to make simple conformational models of alternate D- and L-configuration beta-glucose models to introduce molecular chirality. In addition, the use of index cards to follow the stereochemistry of additions to alkenes was demonstrated. Finally the group was introduced to polyhedra "discovery" exercises with "60° Cubelts" and the extension of this system to show isomerism in an octahedron.

-G. Olaf Larson            Convener

### GENERAL BUSINESS MEETING

Saturday, October 24, 1981, 8:30 a.m.

1. President Erickson called the meeting to order.
2. The Secretary-Treasurer reported on the Executive Council Meeting of the previous day. Items mentioned included:
  - a) Wilmer Stratton will serve as President next year.
  - b) The site and dates for 1982: Cornell College on October 29 and 30.
  - c) The acceptance of the Valparaiso invitation for 1983.
  - d) Granting of emeritus status to Sr. Kennelly and Mr. Krueger.
  - e) The continuation of the Political Awareness Committee and discontinuance of the Placement Committee.
  - f) The Treasurer's report was summarized. It was moved, seconded and carried that the report be accepted.
3. The results of the election of new state representatives were announced:

Wisconsin : Allen Childs, Ripon College  
Minnesota : Brady Williams, College of St. Catherine  
Missouri : Glen Frerichs, Westminster College

4. Health and Safety Committee

Dick Bayer reported briefly for the Health and Safety Committee. He indicated that the main task of the committee would be the gathering and sharing of information. He requested the designation of a safety officer at each college.

5. President Erickson noted the activity of the Council on Undergraduate Research. Jerry Mohrig commented further on the function and activity of CUR and encouraged subscription to the newsletter.

6. Nominating Committee

M. Lee Thompson nominated Pat Fish of the College of St. Catherine as President-elect. Opportunity was given for further nominations. It was moved and seconded that nominations be closed and that Pat Fish be elected by acclamation. Carried.

7. NEW BUSINESS

- (a) The Secretary-Treasurer presented the following proposed amendment to the by-laws:
2. Membership. The active members shall be those whose dues are paid up to date. A member who becomes more than three years in arrears for dues shall be removed from the membership list. Reinstatement will full membership privileges shall require payment of back and current dues, but the assessment for back dues shall not exceed five years' dues.
- (b) Addison Ault issued an invitation to the 1982 meeting at Cornell and welcomed suggestions for the program.
- (c) Eugene Jekel moved that a letter of thanks be written to Kenneth Hamm and staff of Carthage College Chemistry Department for the excellent job done in hosting the 1981 meeting. Seconded and carried by applause.
- (d) Eugene Jekel moved that a letter of thanks be written to the President of Carthage College for hosting the meeting. Seconded and carried by applause.
- (e) Jerry Mohrig moved that Luther Erickson be recognized for his fine job as President. Seconded and carried by applause.
- (f) President Erickson noted the diminished number of active invitations to host meetings and encouraged invitations from member institutions.

8. The meeting was adjourned.

Respectfully submitted,

L. Funck  
Secretary-Treasurer, MACTLAC