MIDWESTERN ASSOCIATION OF CHEMISTRY TEACHERS

IN LIBERAL ARTS COLLEGES

June, 1981

TO: MACTLAC Members in good standing

FROM: Office of the Secretary-Treasurer
Central College
Pella, Iowa 50219

RE: 1980-81 Annual Report

THE EARLHAM COLLEGE MEETING - October 17-18, 1980

Earlham College in Richmond, Indiana, was the host for the twenty-eighth annual MACTLAC Meeting. About 120 members and guests, including 11 from Ohio colleges, attended the meeting. MACTLAC members owe a large vote of thanks to Dr. Wilmer Stratton and his staff for the planning and execution of an interesting and well-planned meeting. Although we had some rainy weather, the beauty of the trees on Earlham's campus in the setting sun following the rain more than compensated for the slight inconvenience of the rain.

The session of Friday afternoon consisted of three brief talks followed by discussions. Mike Doyle, Hope College, Editor of the Council on Undergraduate Research (CUR) Newsletter, discussed CUR and the Newsletter. The purpose of CUR is to promote undergraduate research, including articles related to the funding of research, list sources of research funding, list positions available, and list equipment availability and needs. Those interested in more information about CUR should write to Mike Doyle, Hope College, Holland, Michigan 49423. Howard Hines of NSF spoke about the NSF research equipment program 69A. He discussed the scope of the equipment grants and mentioned that chemistry departments received the largest number of grants with biology departments second. Larry Strong, Earlham College, talked about the science facilities at Earlham College.

At the Friday evening session, President Gene Jekel announced that Larry Strong, Earlham College, and Joe Danforth, Grinnell College, were given Honorary Membership in MACTLAC by vote of the Executive Council that morning. Larry was present to receive the honor. Ted Benfey, Guilford College, former editor of CHEMISTRY, gave the evening address on "Toward a More Humane Chemical Education and Practice."

John Walter, University of Wisconsin Department of Chemistry, gave the address at the Saturday morning session. The title of his talk was "What I Learned in School Today." His main thesis was that there should be cooperation between students and faculty in the learning process. He shared his experiences in teaching and learning in courses of Sophomore Quantitative Analysis and Graduate Research.

There were a number of discussion groups which met on Friday afternoon and Saturday morning. I received summaries of the

discussions from ten of the groups and I thank them for their reports. What follows are their summaries:

RESEARCH GRANTS

Friday afternoon session - Attendance = 25.

Twenty MACTLAC members joined convenor Gene Wubbels, Howard Hines of NSF, Joe Rogers of ACS-PRF, Brian Andreen of the Research Corporation and Norman Craig of Oberlin College for a discussion of sources and strategies of funding undergraduate research. Gene passed out dittoed information on various NSF grants given during the past year. He commented that only three MACTLAC schools had received URP grants in chemistry!

Joe Rogers and Norman Craig had duplicated information available on ACS-PRF programs. Joe said that there was rather poor proposal pressure in the PRF Type B program. It could lead to money being transferred out of the program. MACTLAC members were urged to apply more frequently. Over the past four years, faculty at MACTLAC-type colleges who have applied for B grants have been successful 46% of the time!

Brian Andreen also had information available; he mentioned that successful proposals comprise 30-65% of all Cottrell College Science proposals from small colleges.

Howard Hines talked at some length about the research instrumentation program for two- and four-year colleges and universities, the former 69A program. This program, among many others, is described in the NSF "Guide to Programs." The ceiling may be changed from $25,000 to $35,000 this year. It provided eighty grants in chemistry last year; the average grant was $18,000. An 18% increase in grants awarded is expected for next year. The narrative portion of each proposal should be less than 15 single-spaced pages and should discuss the specific research anticipated and why the equipment is necessary. One does not need to have a research grant in order to qualify for a research instrumentation grant.

Mention was made of the NSF program which grants additional funds to holders of NSF research grants if they have a faculty member of a 4-year college join their research group. This looks like a desirable way for MACTLAC members to fund sabbaticals.

-Jerry Mohrig

Saturday morning session - Attendance = 12

Presentations by Howard Hines from NSF on the Research Equipment Program for 2- and 4-year colleges and universities (old 69A) indicated that this has been a most successful place for liberal arts college faculty and departments to obtain equipment with almost a 50% success rate. Gene Wubbels also covered the status of other NSF programs in Science Education and pointed out the

continuing lack of proposal pressure from MACTLAC colleges. Brian Andreen passed out materials from Research Corporation and fielded questions about the program. Joe Rogers, from PRF, and Norman Craig (Oberlin), who is on the PRF Board, discussed the prospects for success in the various programs. Both the Type B and the Type G (starter) grants, the latter now with a portion set aside for undergraduate faculty, could use more proposal pressure from MACTLAC faculty. The consensus was that the NSF Research Equipment Program (69A) is currently the best bet for getting equipment (although the success rate on ISEP rises considerably above its usual 15% if you apply a second time), while PRF and Research Corporation remain the most reliable source for research support. Funding for undergraduate science at the moment appears to be better available now if organized around research of individuals as NSF science education funds become harder to get.

-Brock Spencer

LECTURE DEMONSTRATIONS

Friday afternoon session - Attendance = 35

After a brief illustrative introduction by George Gilbert, the session was thrown open for group discussion of the topic. The first aspects considered were the reasons usually given for not doing lecture demonstrations: cost, not enough time, hazardous materials, storage problems, and disposal problems. The methods being used to cope with these problems were presented by members of the group. Next, the discussions were directed to the reasons for doing lecture demonstrations. Although no member of the group could offer any quantitative evidence for the utility of lecture demonstrations, the "gut" reasons offered for the use of lecture demonstrations were: they capture attention, they add variety, they spark up a lecture, they allow you to show what you are talking about, they make chemical reactions real rather than blackboard symbolism, and they offer evidence that chemistry is ultimately an empirical science rather than just a theoretical science. The possible use of filmed demonstrations was discussed and it was generally agreed that films are not a viable substitute for the live on-site demonstration of phenomena. Films are useful for teaching lab techniques or problem solving procedures but do not generate the same response as live demonstrations. Films never seem to be just what the lecturer desires unless he makes them personally to fit his idiosyncratic teaching procedures. The point was made that it is important to be sure that a demonstration does, in fact, demonstrate the particular point to be demonstrated. However, demonstrations of phenomena that are not well understood can be used to incite an interest in chemistry. The state of the literature on lecture demonstrations was discussed. The best source is still Tested Demonstrations, but hopefully, the work being done by Bassam Shakhashiri will soon be available. Finally, attention was directed to the carcinogenic nature of some very common demonstration chemicals such as chromium(III) oxide.

-Leonard C. Grotz

Saturday morning session - Attendance = ?

Professor Gilbert began by giving an example of a very short, very graphic demonstration, ($KClO_3$ + P_4) + (hammer). This was a theme that we discussed for the most part of our period: how can we best introduce short, yet graphic, demonstrations into the lecture? Demonstrations that require unsophisticated materials and equipment. We surveyed the major demonstration manuals, devices (e.g. TOPS) and the like.

All agreed that a major problem is time. When does a demonstration become too long or involved? Also, to what extent should lecture material be built around a nice demonstration and vice versa? -Fred J. Hadley

LABORATORY SAFETY - Attendance = 22

The discussion centered around two areas:

A. Should Carthage College (MACTLAC host in 1981) consider a mini short course on Laboratory Safety at the next meeting? Dr. Norman Steere would provide the course. The group suggested that Friday morning would be the best time for this course and that the course should be planned for 25 people. MACTLAC concerns would be given to Dr. Steere in advance of the meeting.

B. The group discussed the ten areas that the new standing committee will be considering. Priorities were considered and chemical disposal was near the top in everyone's mind.
-Richard Bayer.

INSTRUCTION IN THE USE OF THE CHEMICAL LITERATURE - Attendance 20-30

Professor Bill Stephenson of the Earlham Biology Department opened the session by describing a rather extensive (4-year) program aimed at getting the students to use the literature. He pointed out that emphasis is also placed on oral presentations. Professor Gerry Bakker, Earlham, then talked about the efforts in the Chemistry Department to get students into the chemical literature. Students are asked to write up specific syntheses, describe analytical procedures, defend a particular scientific hypothesis, etc. Emphasis here is less on oral presentations and more on reading the literature, as this can also be a way to learn chemistry. The students must write at a number of levels from explaining a simple scientific concept to presenting a more complex chemical tract in publishable form.

To make such a program work well, Earlham allocates money to library purchases on a high-priority basis. Also, the purchases are aimed at fulfilling the needs of the students rather than just a blanket-covering of all chemical journals. Annual reviews, basic texts and reference books are a primary tool. Dr. Bakker feels that the very latest journals are not absolutely necessary for such a program. There is plenty of elegant chemistry sitting in older journals. -Fred J. Hadley

FINANCING THE REPLACEMENT OF LABORATORY INSTRUMENTATION
Attendance = 25

We need to concentrate on physical capital to repair, replace, replenish, redecorate and restore -- as well as money for human capital (salary). We are all guilty of deferred purchases.

A book by Hans Jenny of Wooster College entitled, Hang Gliding or Looking for an Updraft, was mentioned.

Our equipment is mid 20th Century--we are training for the 21st Century. We need to modernize. Big instruments expected life is 14 years; small ones have a 10-year life expectancy. We need planning documents for the 1980s. Inventory all equipment for teaching and administration. If a 20-year life is assumed, then 1/20 should be budgeted for replacement or new equipment. It was recommended that the chemists give the Vice President for Finance a tour to see our points. The subject of grants was discussed: matching funds, equipment funding, capital funding in the budget (central vs departmental). A campus needs to rank unfunded capital equipment needs. Share this with the Vice President for Finance and the Board of Trustees. Sources of funds: 50/50 matching grants, 100% grants and money from development. Watch "free" used equipment--there are often hidden costs. The subject of service contracts was discussed. In the past professors were expected to cure the problems in apparatus but this is no longer the case with the modern equipment of today.

The Council on Undergraduate Research Newsletter is planning an article on this subject by Vick Easley. -Anne Sherren

WHAT ARE THE PROBLEMS OF DOING RESEARCH IN A LIBERAL ARTS COLLEGE?
Attendance = 23

This discussion section, convened by Jerry Mohrig with 23 in attendance, opened with comments by Larry Strong and Luther Erickson concerning their experiences in undergraduate research. Larry recalled that Harry Lewis, one of the most zealous of the founding MACTLAC members, had been a great advocate of both research and enthusiasm in college teaching. Time more so than money was the critical resource for research in Larry's view; he finally had to retire to get enough time for research. There seems to be no alternative to devoting a certain amount of time for research each week no matter what. Larry started up a research effort as he neared retirement, after many years of having little involvement in research. This took persistence and the capacity to get over disappointments with his initial research grant applications. There were two big helps: people he cultivated with access to needed instrumentation, and people to talk with about research problems. Much of the latter interchange Larry carried on by correspondence. Larry also thought it important that the problem selected be scientifically interesting and publishable, but not a "hot" research problem since hot problems are susceptible to being scooped if done at the pace possible in a liberal arts college.

Luther noted that his student experiences at St. Olaf and Wisconsin led him to conclude that research was inseparable from instruction in chemistry, "a part of the job" and that research was fun as well. He also thought that it was a great benefit to a prospective undergraduate researcher to be in an institution where research was expected. Luther found that heavy involvement with summer research involving students was absolutely essential to sustaining his research efforts. Other summer activities such as summer school teaching, course preparation, and "workshops" were hard on research. A good way to "make time" for research was to commit oneself to giving a paper at an ACS Meeting on the basis of partially completed work. The four months after the abstract was sent were invariably times of resolute activity and a clarified agenda. Such commitments also serve as an impetus to finish the research; finishing to the point of giving a talk and publishing the findings is exceedingly important in sustaining research efforts. This also provides a critical bridge to the next problem one attacks. Luther found that one thing leads to another (or several others) in choosing problems, provided that one pursues the first to conclusion.

The session then was opened to questions and comments from the group. One speaker reemphasized the importance of summer work in mounting and sustaining research. Several commented concerning institutional attitudes about research. One reported unhappily that his Dean was excited by a geologist who gave fascinating public interest lectures, but the Dean didn't care much about scholarly work that attracted little public attention. Two others mentioned that research can sometimes be given credit toward one's workload if it is identified as part of the instructional effort. One school has a junior-senior level literature and research course for credit. Each faculty member has charge of the course about once every two years, and the students who enroll are involved in research and reading related to the interests of the faculty member. Another noted that open-ended course labs, particularly those involving syntheses or kinetics, are excellent ways to get some research done and to interest students in research. One asked whether it was possible to pursue a research problem with students in an area not covered by the course curriculum. The consensus seemed to be that it was possible; in fact, such a relationship seemed to be the rule rather than the exception. Earlham and Kalamazoo were mentioned as schools having all-college thesis requirements (Reed and Wooster do also), but knowledge of others was lacking.

Several also commented on the operation of undergraduate research efforts. Some felt it important that problems be segmented into sub-problems of scope suitable for one student, and that this raised questions of how to do it. Another posed the question of what to do about a research student who fails to show up regularly and suggested that research conferences of two or more students on a regular basis are a good remedy. Also, students should be encouraged to work twice as hard in the first half of the term, anticipating that time will become more dear later in the term. Do pre-meds get involved in research? Several said that some of them at their school did indeed, and did first-rate

research. Another mentioned that such graduates, after starting medical practice, are excellent sources of financial contributions to a research program since they often attribute some of their professional success (e.g. admission to med school) to research involvement. Another mentioned that seniors are excellent teachers of research techniques to juniors and sophomores. This teaching can be done very well if some research techniques are incorporated into advanced course laboratories having the senior as the lab assistant. Such practices also enrich the curriculum.

-Gene Wubbels

BIOCHEMISTRY LAB EXPERIMENTS - Attendance = 18

Anna Wilson from the University of Purdue gave a brief description of the biochemistry lab courses and texts used at Purdue. She stressed the importance of keeping complete accurate records of reagents needed, results, problems, and special order addresses for each experiment.

The remainder of the time was spent discussing experiments used by various members of the group in different areas of biochemistry.

INORGANIC CHEMISTRY IN THE CURRICULUM - Attendance = 25

Convenor Wilmer Stratton justified the recurrence of this topic on the MACTLAC agenda in terms of national interest in the subject. At the recent ACS meeting in Las Vegas there was a packed room for a symposium on this topic and an overwhelming sentiment among those present for requiring at least two inorganic courses beyond the first year, preferably one before P. Chem. and one after P. Chem. (The proceedings of that symposium will be published in the issue of J. Chem. Educ.) The ensuing discussion was lively, if inconclusive. It appeared there was general agreement that inorganic chemistry had been displaced from much of the introductory course without finding a home elsewhere in the curriculum. There was support expressed for an inorganic course without a prerequisite of physical chemistry (as proposed by Cotton and others at Las Vegas), although the existence of a full fledged course of this type was reported only by Albion College and Ripon College. The lack of an appropriate text is a serious handicap. A survey of those present disclosed that specific inorganic laboratory courses are relatively rare. Perhaps this survey should be extended and formalized to establish more clearly the position of inorganic laboratory.

In spite of the support for an intermediate inorganic course, there was not uniform support for the proposal that two inorganic courses, one preceding and one following physical chemistry, be required for accreditation. Such a requirement could easily create conflicts with limitations on the number of credits (hours) which can be required (or taken) in a major at some institutions. The opinion was expressed that colleges must retain their general education objectives and that the time to establish their positions with minimum repercussions is in the immediate future when

graduate schools will have need of the graduates from institutions such as those represented in MACTLAC. -Earle Scott

Other discussion groups were: Delphi System of Computer-Assisted Instruction and Use of Small Computers in Chemistry.

GENERAL BUSINESS MEETING

Saturday, October 18, 1980, 8:30 a.m.

1. President Jekel called the meeting to order.

2. The Sec.-Treas. gave a brief report of the Executive Council Meeting which met on Friday Morning, October 17. Items mentioned were:

   a. A summary of the Treaurer's Report was given. The balance as of Oct. 24, 1979, was $212.60 and as of Oct. 15, 1980, it was $118.34, a decrease of about $100. The $1000 Certificate of Deposit came due on Oct. 15. Since some of this $1000 may be needed for ongoing business of MACTLAC, a motion was passed that the Sec.-Treas. place $500 for up to 30 months in a safe investment at the highest return (possibly a Money Market Certificate at 10-12%). The other $500 would be put in a Passbook Savings Account.

   b. 1981 Meeting - Carthage College, Oct. 23-24. Kenneth Hamm, probable program chairman.

   c. Committee Reports

      Gene Wubbels reported on the activities of the Political Awareness Chairman (since a committee does not exist). He will give a complete report later in this meeting. A motion was passed to provide Ida Wallace, Great Lakes Colleges Association liaison person in Washington, D.C., with the MACTLAC membership list for inclusion on her list of "friends and allies." A subsequent motion was passed that this action be brought to the floor of the business meeting for discussion and approval. That will be done after Wubbels' presentation.

      Dick Bayer reported on his work as Chairman of the Health and Safety in Academic Laboratories Committee. He will give a complete report later in this meeting.

      John Zimmerman gave Don Cook's report of the Placement Committee activities. His report will be given later in this meeting.

   d. Thank you letters from James Carney, Rudolph Priepke, and Clarence Grothaus (all awarded Emeritus Membership last year) were received by the Executive Council.

Emeritus Memberships unanimously voted for:

Norman L. Heckman, St. Joseph's College
F. Emmitt Jacob, Drake University
John H. Scott, Macalester College

e. Honorary Memberships unanimously voted for:

Joe Danforth, Grinnell College
Laurence Strong, Earlham College

f. The Sec.-Treas. publicly gave a thank you to Sister Mary Thompson, College of St. Catherine, for her work in updating the computer file of addresses each year. (The file is on the computer at the College of St. Catherine.) Applause

3. Chemical Abstracts Letter

The letter from Dale Baker, Chemical Abstracts Service, to Jim Finholt in response to Jim's thank you letter from MACTLAC was read. (See last year's minutes of MACTLAC.)

4. New State Representatives, Three-year Terms

Dr. J. Phillip Bays, St. Mary's College (Indiana).
Dr. Donald Koeltzow, Luther College (Iowa).

5. Committee Reports

a. Political Awareness Committee

Gene Wubbels, Chairman, gave an oral report and responded to questions. (1) He recommended that the MACTLAC membership list be provided to Ida Wallace as noted above. (2) Gene will resign as Chairman of the Committee since he expects to be on leave of absence next year and possibly out of the U.S.

Wubbels moved, seconded by someone, that MACTLAC provide its mailing list to Ida Wallace with the provision that she consult the Political Awareness Committee Chairman and/or the MACTLAC President before she uses the list. Passed

There was no replacement named for Wubbels as Chairman.

Jekel suggested that MACTLAC owed a vote of appreciation to Wubbels for his work. That "vote" was shown with applause.

b. Health and Safety in Academic Laboratories Committee

Dick Bayer, Chairman, gave an oral report and responded to questions. (1) Presently Dick is a one-person committee but he hopes to have 6-7 members on the committee to serve

for a three-year term. (2) Comments and concerns which the committee should consider should be given to Dick. (3) He reported that a mini-course on Safety in Academic Laboratories may be given at the next MACTLAC meeting, Norman Steere probably in charge. There probably would be an extra charge to attend this mini-course. Wilmer Stratton is distributing a questionnaire to ascertain interest in such a mini-course.

Dick also would like to determine who is the Safety Officer at each MACTLAC School.

c. Placement Committee

John Zimmerman gave the report of Don Cook, Chairman of the Placement Committee. One hundred twenty-three MACTLAC schools were contacted. There were 25 open positions in 23 schools. These positions when broken down indicated the openings were 37.5% in General and Organic Biochemistry, 54% in General and Physical, Analytical and Inorganic, and 8.5% were of the type open for General and the applicant's specialty. The greatest request was for teachers qualified in Analytical or Instrumental Analysis. This listing of openings was sent to each MACTLAC Department Chairperson and to those individuals who had requested the listing by earlier correspondence by a member of MACTLAC. There were approximately 25 persons other than Department Chairpersons who received the listings.

There was discussion on the need and effectiveness of the Placement Committee. Anecdotal comments were made by several members. It was noted that the Council on Undergraduate Research (CUR) Newsletter can serve that need through its 3 times/year Positions Available List. A show of hands indicated a continued desire for the service. Quentin Peterson, former Chairman of the Committee, traced a little of the history of the Committee and suggested the CUR could provide that service.

It was moved and seconded that the Sec.-Treas. write a letter of appreciation to Don Cook as Chairman of the Committee. Passed.

6. President-Elect

Mohrig, Chairman of the Nominating Committee, nominated Luther Erickson, Grinnell College, as President-Elect. There were no nominations from the floor. The motion was unanimously passed.

7. Secretary-Treasurer

Mohrig, Chairman of the Nominating Committee, nominated Larry Funck, Wheaton College, as Secretary-Treasurer for a three-year term. There were no nominations from the floor. The motion was unanimously passed.

8. Old Business

None.

9. New Business

a. Lee Thompson moved, seconded by someone, that the Sec.-Treas. write a letter of thanks to the chemistry faculty of Earlham College for the excellent job of hosting the 1980 MACTLAC meeting. The motion was passed with a round of applause.

b. Lee Thompson moved, seconded by someone, that the Sec.-Treas. write a letter of thanks to the President of Earlham College for their hospitality in hosting the 1980 MACTLAC meeting. The motion passed.

c. Wilmer Stratton suggested that we owe a round of applause to Eugene Jekel for his work as past president. Applause.

d. Kenneth Hamm invited members to the MACTLAC meeting in Carthage College next year, Oct. 23-24, 1981.

e. It was announced that the 1982 meeting will be at Cornell College.

10. The meeting was adjourned.

MEMBERSHIP LIST UPDATE

Enclosed is a form regarding updating our membership and dues file. The appropriate section of our By-Laws states: "The active members shall be those whose dues are not more than one year in arrears. A member who becomes more than one year in arrears for dues shall be removed from the membership list. Reinstatement with full membership privileges shall require payment of back and current dues, but the assessment for back dues shall not exceed two years dues." We would like to keep all interested, eligible chemists on our membership list. If you also want to pay the 1981 dues (which normally are not due until the annual Fall meeting), please indicate such payment on the form.

If this newsletter is addressed to someone at your school who no longer is there or whose address is incorrect, please let the Secretary-Treasurer know. Also indicate prospective MACTLAC members on that form.

New President

Wilmer Stratton, current president of MACTLAC, has had an unexpected opportunity to take a group of students to Europe for this Summer and Fall. This will make it difficult, if not impossible, to continue his duties as president. President-Elect Luther Erickson, Grinnell College, has agreed to take over the responsibilities of president, effective July 1, 1981.

Sincerely,

Arthur J. Bosch

Arthur J. Bosch
Secretary-Treasurer, MACTLAC