

POSITIONS AVAILABLE:

ASSISTANT PROFESSOR OF CHEMISTRY. Clarke College, a Catholic, liberal arts college in Dubuque, Iowa seeks a qualified person for a tenure track position in the Department of Chemistry to begin in August 1990. Ph.D. required. Expertise in the following areas required: Organic Chemistry and Biochemistry. Successful candidate will teach in the Chemistry and Molecular Biology programs. Position will remain open until filled. Send letter of application, resume, and three letters of recommendation to Mary Alice Muellerruelle, Ph.D., Academic Dean, Clarke College, 1550 Clarke Drive, Dubuque, IA 52001. AA/EOE.

DEAN COLLEGE OF LETTERS AND SCIENCES - JAMES MADISON UNIVERSITY - Search began February 15. Contact Placement Officer for full page description of the position.

POSITIONS DESIRED: (Contact Placement Officer to obtain curriculum vitae of a candidate).

INORGANIC/ANALYTICAL CHEMIST - Undergraduate degree in Chemistry; graduate degree in Inorganic Chemistry.

PHYSICS/PHYSICAL CHEMISTRY - Undergraduate and graduate degrees in Physics. Wants a position in the Chicago area.

BIOCHEMISTRY - Undergraduate degree in Biology/Chemistry; graduate degree in Biology. Wants a position in the Chicago/Midwest area.

PLEASE, PLEASE - Send positions available to the new Placement Officer:

LARRY FERREN
MACTLAC PLACEMENT OFFICER
Chemistry Department, Box 6047
Olivet Nazarene University
Kankakee, IL 60901

MACTLAC Executive Council for 1989

- Larry Funck, President (IL)
 - John Crump, President-Elect (MI)
 - Forrest Frank, Secretary-Treasurer (IL)
 - Jerry Mohrig, Past President (MN)
 - Derek Chignell (IL)
 - Ross Latham (MI)
 - Lawrence Scheich (WI)
 - Reva Servoss (MO)
 - Carolyn Mottley (IA)
 - Patricia Fish (MN)
 - Philip Bays (IN)
- Anne Sherren, Archivist and Placement Officer (IL)

To: MACTLAC Members
From: Office of the Secretary-Treasurer
Illinois Wesleyan University
P.O. Box 2900
Bloomington, IL 61702
Re: 1989 Annual Meeting Report
Date: November 1989

THE LUTHER COLLEGE MEETING - OCTOBER 27-28, 1989

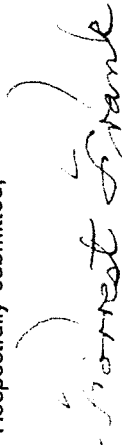
Approximately 160 members of MACTLAC met on the campus of Luther College on two warm fall days for the thirty-seventh annual meeting. The entire meeting was exceptionally well organized by Dr. Walden Heino and his colleagues at Luther College.

The meeting began on Friday afternoon with an excellent and amusing welcoming statement by Dr. H.G. Anderson, President of Luther College. Dr. Carolyn Mottley introduced the main speaker, Dr. Irving M. Klotz of Northwestern University who gave an interesting keynote talk on "Science Literacy - What Do We Mean and What Do We Want?" (Dr. Klotz' book, "Diamond Dealers and Feather Merchants" is available from Birkhauser Boston Inc., c/o Springer-Verlag N.Y. Inc., 44 Hartz Way, Secaucus, NJ 07094.)

Following a break, the conferees attended two one-hour discussion groups. At 5:00, when no other groups were scheduled, Dr. Fay Thompson, safety officer at the University of Minnesota, lectured on "Chemical Safety: Waste Disposal". After an excellent banquet in the Peace Dining Room, all gathered to hear Dr. William Swalley of the University of Iowa lecture on "Research in Laser Chemistry".

Saturday morning began with the Annual Business Meeting - the minutes follow. Dr. Frederick Foss, Winona State University, gave the keynote talk, "Teaching Chemistry with Demonstrations". He discussed a course he has taught for several years in which the entire course is based upon demonstrations. One more discussion period followed. The minutes of the discussion sections which were given to me are attached to this report along with a list of the discussion groups.

Respectfully submitted,



Forrest J. Frank
Secretary-Treasurer of MACTLAC

GENERAL BUSINESS MEETING
Saturday, October 28, 1989

1. President Larry Funck called the meeting to order at 8:15 a.m.
2. The Secretary-Treasurer reported on the Executive Council Meeting of the previous day. Items mentioned included:
 - a) A summary of the treasurer's report. The balance is \$1873.83 as of the beginning of the MACTLAC fiscal year October 1, 1989.
 - b) A reminder that nominations are solicited for both honorary and Emeritus Membership with the deadline October 1, 1990.
 - c) It was moved that the President be directed to write a letter to the Secretary-Treasurer and his school expressing thanks for his service to MACTLAC. Seconded and carried with applause.
 - d) Edward Carberry, of Southwest State University, Minnesota told of his leading a delegation of U.S. to Russia in Summer 1990 to discuss chemical education of non-chemists.
3. The Placement report by Anne Sherren follows:

1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Applicants	2	5	10	6	10
Positions	4	27	20	5	10
				6	11
4. New State Representatives were announced and introduced:
 - Indiana - Bill Morrison, University of Evansville
 - Missouri - Edwin Lane, William Jewell College
 - Iowa - Clinton Rilla, Iowa Wesleyan College
5. Nominating Committee: Carolyn Mottley, chairperson of the Nominating Committee, nominated Anne Sherren of North Central College as President-Elect and Brad Gborvigen of College of St. Thomas as Secretary-Treasurer. After opportunity was given for nominations from the floor, the motion was moved, seconded and passed to close the nominations.
6. New Business:
 - a) Bill Martin of Lake Forest told about the 1990 meeting of MACTLAC to be held at Lake Forest College, Lake Forest, Illinois on October 19-20, 1990. The theme will be science literacy.
 - b) It was moved that the members of MACTLAC express our sincere thanks and appreciation to Larry Funck for his service to MACTLAC in the capacity of President. Seconded and carried with applause.
 - c) It was moved that MACTLAC direct the Secretary-Treasurer to write letters of thanks to the President and Chemistry Department, especially Walden Heino, of Luther College for hosting the 1990 meeting. Seconded and carried with applause.

7. The meeting was adjourned at 9:10 a.m.

Friday, 27 October, 1989

10:00 Executive Council Meeting
Nobel Room, CU

10:00-5:00 Registration
Concourse, VH

11:30 Lunch
Peach Dining Room, CU

1:00 General Meeting
Recital Hall, CFL

Welcome: H.G. Anderson
College President

Keynote Address:
"Science Literacy - What Do We Mean and What Do We Want?"
Irving M. Klotz,
Northwestern University

2:30 Coffee Break-Concourse, VH

3:00 Discussion Groups 1-6
VH Rooms

4:00 Discussion Groups 6-10
VH Rooms

5:00 Discussion Group 11
VH 117

6:00 Campus Tours or Appetizers
Hammarkjold Lounge, CU

7:00 Banquet
Peace Dining Room, CU

Saturday, 28 October, 1989

8:30 Evening Address:
Peace Dining Room,
"Research in Laser Chemistry", William Swalley
University of Iowa

9:45 Mixer - Snacks, Cash Bar
Mabe's Viking Room
Downtown Decorah

7:00 Breakfast at local restaurant
or College cafeteria, CU
(serving line cost)

8:00 Annual Business Meeting
VH 117

9:00 Morning Address
VH 117
"Teaching Chemistry with Demonstrations"
Frederick Foss
Winona State University

10:00 Coffee Break
Concourse, VH

10:30 Discussion Groups 7, 11-15
VH Room

11:30 Executive Council Meeting
(with lunch)
Nobel Room, CU

11:30 Lunch
Cafeteria, CU
(serving line cost)

REMINDER ABOUT HONORARY AND EMERITUS MEMBERSHIPS: All members are reminded that persons must be nominated for Honorary Membership. Emeritus membership is awarded upon receiving a request for it upon retirement providing the person has been a MACTLAC member for at least ten years. All nominations should reach the Secretary-Treasurer prior to October 1, 1990 for consideration at the 1990 Annual Meeting.

CURRENT STATUS OF FUTURE MEETINGS: Future annual meetings: 1990 Lake Forest College, Lake Forest, Illinois; 1991 Albion College, Albion, Michigan; 1992 Grinnell College, Grinnell, Iowa.

RECYCLE LIST: If you have equipment or other items which you wish to give away or sell cheaply, please send a description to the secretary, for posting on a bulletin board at the next annual meeting.

REQUEST FOR ARCHIVAL MATERIALS: Those of you have any archival materials, please contact the Archivist Anne Sherren.

I take this opportunity to thank all of you who have made my job easier as your Secretary-Treasurer. It has been an honor to serve this wonderful organization.

Discussion Group 10 - Brady W., recorder Organic Chemistry

Phillip Bays, chair, called the group to order by asking the question, "What do we do about organic?" He pointed out that the texts keep getting bigger and it has become impossible to cover everything. What then do we leave out and is the current sequence dictated by the order of topics in the texts (all the same) the best?

In the discussion it was noted that there are shorter texts and that a few do use a different sequence. The topic list is also driven by ACS tests and by expectations of future course work. If you leave out a topic, how do you deal with it when the topic is assumed later in the book?

There was a lively discussion of the relative merits of topics such as S_N1 reactions, biochemistry, and free radicals.

Finally, the possibilities for different texts were discussed. The problem appears to be reluctance of the larger universities to change course. Some suggested it was possible to use desk top publishing to produce ones own materials.

The second major topic was laboratory. Some were using paperback technique manuals with subsequent experiments locally produced. There is not a good technique manual for microscale. Microscale is being used in about one half of the represented schools, either completely or in part. Some noted that good kinetic experiments and the visual satisfaction is less in microscale. Big universities are not using microscale, but this is in part due to personnel problems (the TA's don't know how).

In response to a question, most reported that they teach systematic (IUPAC) nomenclature.

About one half of the schools are teaching advanced organic, and about one half of those have a lab (others have integrated lab). There was a discussion of books, techniques and approaches used.

Discussion Group 8 - George Shields, recorder Interactions with Non-College Students

Group leader Carolyn Mottley discussed two programs done at Luther College, the elder hostel program for senior citizens and the creative chemistry program for 8-12 year olds. Both programs are run in the same manner. The cost for Creative Chemistry is \$60 for the five Saturday course and the text, *Chemically Active*, by Vicki Cobb (J.P. Lippincott, New York, 1985). In addition, there is a \$5.00 insurance charge. Student assistants from Luther are paid minimum wage and there is one assistant for every 4-5 children. Currently there are two sessions, one in the fall and one in the spring with 30-35 children in each session. The six year old program seems to have had success in generating interest in science in general - chemistry in particular - among the graduates of Creative Chemistry. It was suggested that a coordinated study of the success of the program would be of great help and interest to the general scientific community. The administration at

DISCUSSION GROUPS

Moderators
Room Numbers

All meeting rooms located in Valders Hall of Science

	Friday 3:00-3:50	Friday 4:00-4:50	Saturday 10:30-11:20
1.	Discussion of Klotz talk Michael Collins, 264	6. Small Departments (cont.) Clinton Rila	7. Grant Proposals (cont.) Brian Andreen Joseph Rogers
2.	Young Faculty Marian Cass, 253	7. Grant Proposals Brian Andreen Research Corp.	11. Chemical Safety: Waste Disposal (cont.) Fay Thompson, 117
3.	Writing in Chemistry Courses Lawrence Potts, 209B	8. Interactions with Non- College Students Carolyn Mottley, 109	12. Discussion of Foss talk Randall Robinson, 107
4.	General Chemistry Wayne Wolsey, 168	9. Analytical Chemistry Brian Miller, 206	13. Computers in Chemistry James Fiholt
5.	Physical Chemistry Mary Thompson, 110	10. Organic Chemistry Philip Bays, 164	14. Biochemistry Elliot Uhlenhopp, 113
6.	Small Departments Clinton Rila		15. Inorganic Chemistry Walden Heino, 209A
		Friday 5:00-5:50	
		11. Chemical Safety: Waste Disposal Fay Thompson U. of Minnesota, 117	

Luther fully supports the program, providing overhead and the use of the facilities. Creative chemistry is financially self-sufficient, and now offers scholarships to needy students. Plans are being made to train elementary teachers to provide better science teaching to this age group of children.

A high school chemistry teacher made the point that most students are turned off from science before entering high school, so that the elementary school was the critical period to excite children about science and chemistry. She also requested that more college teachers contact high school teachers and offer their support. A.T. Schwartz from Macalester mentioned that the ACS was developing a program of support for high school teachers.

Other programs which were mentioned in this session were Division Day at Rockford, an eight week program at University of Evansville in the elementary schools, a program at Beloit, Chemistry Week at University of Minnesota, and a high school teachers workshop on instrumentation at Luther College.

Discussion Group 6 - Clint Rilla, recorder Very Small Departments

Eight persons attended the first session and five attended the second session.

Second session topics started with the question "How can we maintain library holdings?" The ensuing comments centered on periodicals. The ACS journals were the center of the collections which ranged from 6-15 subscriptions. One school is still getting CA, although not the indices.

Teaching loads ranged from 15-22 contact hours. Three schools reported normal loads as being two lecture courses and several laboratory sessions. The inclusion or separation of pre-medical majors in the list of chemistry majors revealed one school where there was a separate pre-med major and one school where nearly 90% of all chemistry majors were in such pre-med studies.

There was general agreement that there was accommodation between the conflicting demands of athletic practice and laboratory times.

Bruce Holman of Wisc. Lutheran was recorder for the first session.

Discussion Group 7 - Brock Spencer, recorder Grant Proposals

Dorothy Pierce (Petroleum Research Fund) and Brian Andreen (Research Corporation) presented the types of grants available: support, eligibility, application and evaluation procedures, and current competitiveness for their programs.

Discussion Group 6 - Brian Miller, leader Analytical Chemistry

Suggested Topics: 1) Integrated Laboratory - which topics covered; 2) Chromatography - where to introduce what; 3) Surface Analysis Techniques; 4) Environmental Chemistry: sampling to results; 5) Useful software; and 6) Packaging - how much inst. anal. to put in quant. or other courses.

Packaging (i.e. Curriculum)

At Wheaton College:

Freshmen: 1st Semester - General Chemistry: Qual. scheme.

2nd Semester: Lab - 2/3 is analytical, e.g. EDTA, redox and acid/base titrations, pH plotting, paper chromatography, gravimetric analysis, UV. - Vis (Fe in water).

Sophomores - Organic: GC. - Quant. analy. of oxidation products, LC - separation and product isolation, IR & (NMR).

Juniors: Analytical - 22 people, titrations (non-ag. & complexom. of mixture); ISE, AA; HPLC; fluorescence; stats. sampling. Adv. Analytical - 3-18 people, 1) IR, NMR, TPGC, electronics, XRF, CV, Polarogr., ASV; 2) Roman, Adv. Fluorescence, FT, NMR, IR.

Seniors: Methods in Physical Chemistry - spec. & magn. measurements; Physical Chemistry Lab - Kinetics, X-ray diff., Hydrod. Echem.; dipole; conductance.

Q: Who is responsible for teaching about instruments? A: This looks like a whole curriculum; BM. - Analytical Chemists usually; Analytical Chemistry is the science of doing careful measuring to the extent that physical chemists can do that they are doing analytical chemistry.

Q: What is the most appropriate method? A: BM. - Usually taught in 1st semester junior year.

Q: Reqs. - Is advanced analytical required for major? A: Many respond yes even for basic major.

Q: How do students choose between advanced techniques? A: BM. - Rotation of equipment - students have open lab.

Q: How many schools have this equipment? A: almost all other schools, eg: HPLC. Suggestions: 1) buy one pump at a time; 2) JCE software; 3) buy demo unit near the end of fiscal year.

Q: Teaching inst. simultaneously with Physical Chemistry, flask from CPT? A: BM. -no.

Opinions: Concern with moving wet techniques into freshman year without in upper levels - students don't really get it. BM. - most juniors need to repeat to get up to performance; Strategy - desire to help biologists get exposure in earlier (freshman year) course.

Q: Do biologists take chemistry major general chemistry credits? A: BM. - yes, required.

Q: What about solution equil? A: BM. -After statistics in junior year 1st semester.

Q: Texts? A: BM. - Skoog & West 5th edition; Inst. - Strobel & Heineman for 2nd semester.

Q: Qual. - not with equil. in lecture in freshman year? A: BM. - students' understanding at that point is weak. Suggestion: start lectures with solution equil. in freshman year in 1st semester.

Q: Integ. lab - is there a more efficient way of learning these techniques? Integrating causes scheduling problems. A:

Scheduling:

1st semester

Fr. Gen. 1

So. Org. 1

Jr. Analyt I

Sr. Adv. Inorg.

Adv. Analyt II

Biochem*

2nd semester

Gen. 2

Org.

Adv. Analyt 1; Biochem*

Methods in Phys. Chem.

+ Res. req. for ACS in Sr. year (usually)

* cell and mol. biol. also required

Q: How much can you cover in one lecture? A: BM. - one chapter; students get a lot on their own.

Q: Do people get some inst. before physical chemistry? A: BM. - yes; must have some before physical chemistry lab.

Q: Is that a problem? A: BM. - yes but we catch up. Suggestion: put kinetics expt. into org. lab.

Q: Do people slant things toward biologists? A: No.

Q: Good book for biologists? A: No but G.D. Christian's book has more for biologists.

Q: Electrophoresis? A: BM. - Done in biochem or in cell-molec. bio course; others say some in inst. lab.

Q: What about giving student manual and sitting down with inst. alone? A: BM. - Time consuming; I give them some starting help but that's basically what happens.

Q: What about check on "real" samples? A: BM. - I check blank and calibr curve but if they mess up with solns. I can't tell.

Q: Isotopes? (radioactivity expts) A: BM. - no; but our biology labs do scint/isotopic dilution. Suggestion: pull metallic Fe out of cereal with magnet as a simple detn.

Surface techs. - suggest XRF attachment with SEM; Chromatography; C- problem is to get student work out proper solvent system or T-program; BM. - GC expt. - takes hours - students do on their own.

**Discussion Group 1 - Lawrence Dieterman, recorder
Discussion of Klotz talk**

Discussion leader: Dr. Collins

Dr. Collins initiated discussion by stating that the use of case studies by Dr. Klotz is a good way to get students interested and involved. Certain individuals contributed possible case studies that, implicitly, would generate student thinking about the molecular composition of matter. Dr. Klotz was asked for modern case studies. He suggested genetics and cold fusion.

During a discussion of courses for non-science majors, Dr. Schwartz from Macalster described the chemical program being developed by ACS. The question, "Are we addressing gendering in science?" was posed. Experiences with courses for science majors and non-science together were described. Thoughts were expressed about teaching non-science students certain fundamental chemistry concepts.

The meeting concluded with a few comments concerning the following items requested by persons at last years MacIac meeting: 1) Labs for non-science majors; 2) Role of polymers; 3) Texts for non-science chemistry students.

**Discussion Group 5
Physical Chemistry**

The most popular text is Atkins. The numbers were Atkins 7; Noggle 5; Barrow 4; and Alberty 1 with one using Castellan-McQuarrie combination and one using a book he is writing.

Most are using experiments from Shoemaker and Garland or experiments to which they have devised themselves. One mentioned a sequence in which: 1) the vapor pressure of acetic acid is measured; 2) vapor studied with FTIR to show monomer-dimer equilibrium; 3) discussion of Trouton constant and effect of the dimerization.

One person has developed a series of polymer experiments using a wide variety of instrumentation. One has developed 3 new laser experiments.

Several people do interfacing. Those mentioned were Montana, Lab-View, Add-a-Lab.

Error analysis was considered important. Laboratory writing is important. One person has six experiments and three are written in journal form. Another stressed the importance of talking about experimental results and every student must report orally on an experiment.

Microcomputers are widely used in physical chemistry. Spread sheets are used a lot for many types of problems and many thought this better than programming. Some concern was expressed that math CAD packages might allow solving of problems without knowledge of the background of the problem. Someone mentioned Barrow's programs, useful because they allow the user to quickly see the effect of changing parameters, and one quickly gets good visual images.

We discussed the possibility of research in physical chemistry. There is a trend toward students taking physical chemistry during the fourth year, not allowing time for research. Another person thought students sometimes do some advanced problem without understanding basic background ideas.

We discussed testing methods. A fairly large percentage use take-home tests. One allows students to put whatever information they wish on a 3 x 5 card, to be used during the test.

A majority of those present require only one term of physical chemistry for a basic chemistry major. Several mentioned problems teaching this somewhat general course and then following with a second. No one uses the one-term physical chemistry books. All have the general requirement of two calculus courses and a year of physics to go with the chemistry major. Those showing an interest in physical chemistry should be encouraged to take more math. Differential equations was suggested as particularly useful.

Minutes from Session "Writing in Chemistry"

MACTLAC Meeting, October 27, 1989
Luther College

Chair: Lawrence W. Potts, Gustavus Adolphus College

Recorder: Michael Ross, St. John's University

Potts began the session by discussing the writing requirement at Gustavus Adolphus, and then opened the session for questions, comments, and discussion.

Gustavus Adolphus has just ended its fourth year of a writing requirement for graduation. The requirement is that students must take three courses designated as "W" courses during their four years at the college. At least two of these courses should be at the intermediate level or above, and (we recommend) at least one will be in a student's major area. Courses and instructors are certified for the writing requirement. An instructor submits a course for approval, promising to require at least 3000 words of polished prose (edited and revised) and to provide at least two lecture hours for the teaching of writing. At the represent time about 70 courses carry the W

designation, about 50 of which are outside the English department. The Chemistry Department at Gustavus offers three W-courses: Physical Chemistry I and II, and Instrumental Methods of Analysis. Prior to the writing program, these courses required detailed written lab reports. The additional burden on students and faculty is the writing-editing-revising cycle. We have used computer network technology to streamline this process, as described later. The college has supported this program by hiring a Writing Program Director, and by providing several workshops for faculty members who wish to learn about teaching writing. Recent surveys upon graduation of the first class literally required to take these courses show that the program is popular with both students and faculty. The most common complaints from faculty involve the extra time required to edit. Students most often complain about difficulty finding available courses in their major area.

Potts explained the use of the computer network. Students have rights to their own subdirectories, and keep files of their lab reports in these subdirectories (and on diskettes, as well). The word processor, PC-Write, is used for all work. It writes ASCII-code files that can be perused with operating system shell programs such as Norton Commander. The program supports multi-colored characters, which make additions and correction quite visible to students, who work with color monitors. The word processor allows the instructor to reformat text, opening it up to insert lengthy comments. This technology is popular with students.

Question: What do you do for students how have difficulty writing?

Answer (Potts): Students can be referred to the writing tutors, who are English majors on work-study financial aid, who can be found in a room in the college library almost any evening. Most chemistry students have taken freshman composition, know the fundamentals, and are good writers. Most need only to be reminded to be more careful about their writing. I have never referred a student to the tutors.

Question: Is writing more or less important than content?

Answer (Potts): The grade in writing can be up to 10 points out of 100, or essentially a letter grade. The edit-revision cycle solves most writing problems, and very rarely do students lose credit for poor writing. Almost all credit is given for quality of the lab work and of the reasoning in the report.

Question: Do they write better?

Answer (Potts): Yes. They write better if they are simply reminded that it counts! They write better than do the authors of many of the papers I have reviewed for journals.

Question: What about the use of literature in reports?

Answer (Potts): Much of the background information about the experiments is given in the homemade lab manual. I tell students not to repeat what appears in the manual, but I encourage them to supplement it and to show clearly where they departed from the methods described.

Question: Is your philosophy "learning to write," or "writing to learn"?

Answer (Potts): The dominant philosophy at Gustavus is "writing to learn." Writing is a window to the mind of the student, and is a good way to observe the depth of a student's understanding. This forms the theme of a book by

William Zinsser called "Writing to Learn" (Harper and Row, 1988). Zinsser visited Gustavus in 1986 to see what we were doing, and wrote three chapters of his book about our writing program.

Comment: Someone observed that writing reports in the format of an article for Analytical Chemistry may not be a good idea. The comment maker objected to the stylized prose of scientists writing for each other, and the use of the passive voice. Potts uses the journal format as a template (Introduction, Experimental, Results, Discussion) for students organizing their thoughts. Potts strongly discourages the use of passive voice in student reports. (There was general approval of this view).

Comment: Teachers need to force students to write to the subject matter and keep their writing short and integrated. (There was general approval).

Question: Do you give feedback to students specifically on their writing?
Answer (Potts): Yes. Feedback on writing is as specific as possible. When writing is very poor and there are too many comments to add to the manuscript, I ask the students to meet with me and we discuss their writing.

Question: At what point does student writing reflect your ideas? If the paper ends up a mix of what you suggest and what students write, how do you grade the work?

Answer (Potts): I do not supply much actual wording at editing time. I try to focus on ideas and organization. I have had no trouble seeing what the students contribute to their reports, and find that I can grade them without much trouble. If they imitate me, I'm pleased.

Comment: The computer can become impersonal, and there are other approaches. First, the teacher could meet with students as they hand in reports, and have the teacher read the paper and describe what he or she likes and dislikes. This also can be used as a probe of understanding. Response from Potts: I have considered asking an outside evaluator to review written reports, but cannot find a way to make this efficient. A colleague at Gustavus has students in a class prepare written reviews of each other's work. This has worked very well: students catch almost all the shortcomings of their colleagues' work.

Comments: Others have done peer review of papers with success. One comment-maker worries about students being overly-critical and caustic in their comments, and so uses a form calling for comments about specific problems. It also helps if the teacher coaches students about making positive criticisms. Reviews are used in revising papers. Reviews are also graded.

Comment: Evaluation (grading) should be based on improvement made in writing.

Comment: The commenter stressed the importance of teaching students to write to different audiences. He has had students write reports to him as the president of a mythical chemical company, and has found this to be successful.

Question: Do you teach writing in class?

Answer (Potts): We agree to spend about two hours of class time on writing instruction during the semester. At mid semester (after everyone has done one report), I go through an exercise I call "The Good, the Bad, and the Ugly." I hand out examples of good writing, mediocre writing, and terrible writing from previous instrumental methods classes. Students read the reports and come to class prepared to dissect them in a "group review" process. Even poor writers can spot terrible writing.

Question: Foreign students, for whom English may be a second language, may have special problems. How do you deal with them?

Answer (Potts): Because of the homogeneous clientele of Gustavus and the strong academic backgrounds of the few foreign students we have, this has not been much of a problem. I have offered more help to students who have faced these problems. The other student in the team provides help, also.

Question: Have you tried this method in lower-level courses?

Answer (Potts): No. Reports in Quantitative Analysis and Organic Chemistry are short-answer reports. These courses are large, and careful revision and grading of lengthy reports would be very difficult.

Comment: The transition from short organic reports to long written summaries is a shock to many students. (There was general agreement)

Question: Can students fail the class if they cannot write?

Answer (Potts): It might be possible. However, the editing and revising cycle does improve writing, and even those who struggle at first improve. I grade on the final document, not the first draft, and it is unusual for there to be many writing problems in the final version.

Question: Do you grade lab notebooks or journals?

Answer (Potts): I expect students to follow guidelines for keeping a notebook, and penalize those who ignore the guidelines. I emphasize that the notebook is their record, and that it must be kept carefully.

Question: Does anyone present teach writing in courses for non-majors?
Answer: No

Potts opened the floor to anyone wishing to share what they were doing in writing. There were five responses (unfortunately, names, schools, and many details were missed). One school requires students to work on an advanced-level "W" project, complete with literature search, critical analysis, and editing-revising cycle. Another requires a freshman level course in writing and a junior-level writing experience connected to an advanced lab course. Still another requires a freshman composition course (or passing a proficiency exam) before being allowed to enter junior-level courses. An across-the-curriculum component of two four-hour courses (each requiring three 1000-word papers) is also required. A fourth school requires freshman comp and four other courses with emphasis on writing. A fifth school uses January Term for writing courses.

Discussion Group 13 Computers in Chemistry

A well-attended discussion group on Computers in Chemistry was lead by James Finholt of Carleton College. Discussion focused on the use of spreadsheets and equation solvers in physical chemistry, but expanded to include word-processing and programming, and other areas and levels of chemistry instruction. The group also addressed the advantages and disadvantages of a number of commercial software packages, ways to find programs for activities into a course, and which computer skills chemistry majors should develop.

Spreadsheets and equations solvers are used at Carleton to investigate entropy, eutectic point, equilibrium, and kinetics problems via calculations and graphing. Students receive detailed instructions at first, and with each assignment, use the computer more independently. The faculty's goals are to show the students the ease and usefulness of the computer to a degree that encourages the students to continue using computers beyond the context of the course.

Considerations for choosing software include cost, student versions versus complete versions, how easy the program is to learn, and how applicable the program is to a variety of chemistry problems. Equation solvers discussed included MathCad, Mathematica, TKSolver, and SEQS. The March 14, 1989 issue of PC Magazine includes a review article on equation solvers.

Spreadsheets discussed included SuperCalc IV, Lotus 123, and Excel. The Vol. 11B, No.1 issue of the Journal of Chemical Education: Software includes a series of exercises in physical chemistry as written material along with four disks of programs and routines.

Ways to find applicable software include users' groups, such as SigmaChem for Macintosh users, and compilations of public domain software. Computer-based activities can be incorporated into a course via in-class demonstrations using a computer and liquid crystal overhead projection device, and via out-of-class assignments. In general, chemistry faculty gave introductory instruction in computer use to the students, and relied on the students' initiative for expanded skills development. Computer skills which the group identified as valuable for students included word processing, spreadsheets, equation solvers, and databases, with perhaps less emphasis on programming. These skills could be acquired through exposure to these techniques by beginning in freshman level classes and continuing throughout the student's education.

Finally, the suggestion was made that the next MACTLAC meeting might include sessions on "your favorite program and what you do with it."

Discussion Group 6 Small Departments

Representatives of seven small chemistry departments all seemed to have one question on their minds: How in the world do you do it all? Three came from one person departments and four from two person ones, but additional faculty was expected within a year in two of the three single person

departments. Teaching loads ranged from 12 to 15 credit hours with some having to teach multiple lab sections or outside of chemistry.

Frustrations of balancing requirements of academic standards and student retention were voiced. Council for achieving this was to (1) set realistic goals perhaps by using ACS standardized exams for "calibration" and (2) to clearly communicate to the student your expectations and your advice as to how to reach the goals of the course.

The graduates of the departments usually ended up in medical school, graduate school, or in industry, in about equal proportions. However, in one case where a special effort was made to encourage students, an equivalent number also became teachers. One member noted a trend in graduates that could indicate some lack of sophistication in choosing a career, evidenced by many students making a significant career direction change soon after embarking on their original choice.

Unanimous support was voiced for having a similar discussion group at subsequent meetings.

Discussion Group 15 Inorganic Chemistry Meeting

Topic 1. Experiments typically covered in an Inorganic lab.

Various experiments or experimental techniques were mentioned including: Schlenk apparatus experiment; Molybdenum complexes (J. Chem. Ed. 1986); Experiments from book by U. Hofacker (1980 Freeman); Chromium (II) acetate; Sodium amide in liquid ammonia; Thiourea complex (J. Chem. Ed. 1987); Co complexes - Do analysis using reverse phase HPLC + vis. detection. (J. Chromatography, Buckingham 84-85); 18 Crown-6; Clathrates, cryptates; Ferrocene and derivatives; and Cobalt oximes. Books suggested were: Angelici; Pass and Sutcliffe; and Adams and Raynor.

Topic 2. Integration of inorganic laboratory.

Luther College has no lab with the inorganic course. The inorganic lab is integrated into an advanced inorganic/organic "Synthetic Techniques" lab. The University of Evansville is thinking of reinstating inorganic lab. Carleton - one year, crossing all disciplines inorganic/organic preps during the January term.

Topic 3. ACS survey on intermediate inorganic course:

Topics covered include: Ionic substances; Covalent Molecular Sub.; Metallic sub.; Acid/base chem.; Chem. of main groups; Coordination chem.; Organometallic chem.; other special topics (e.g. redox and electrochem); other areas. Topics suggested as special topics: bioinorganic; solid state; symmetry; photochemistry; spectroscopy; and multinuclear NMR. Books used: Butler and Harrod; Wulfsberg; Greenwood and Earnshaw; A. Vincent, Programmed learning text on symmetry for spectroscopy, Pass and Sutcliffe, Adams and Raynor.