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SCHEDULE:

April 8 to June 1 - Participants will register for the Symposium.

There is no registration fee.

June 1, 1996 - Papers will be made available for SESSION 1

June 3 - June 7 - Short Questions for Papers 1 to 5
Paper 1 on Monday, Paper 2 on Tuesday, etc.

June 10 and 11 - Discussion of Paper 1
Jerry A. Bell and Andrew Ahlgren
American Association for the Advancement of Science
"What is AAAS Project 2061? Why Should Chemists Care?"

June 12 and 13 - Discussion of Paper 2
George M. Bodner
Purdue University
"Mental Models: Implications of Differences Between Students and Their Instructors"

June 14 and 17 - Discussion of Paper 3 (LORETTA JONES)
Loretta L. Jones
University of Northern Colorado
"The Role of Molecular Structure and Modeling in General Chemistry"

June 18 and 19 - Discussion of Paper 4
Brian Tissue
VPI and State University
"Development and Delivery of Chemical Education Hypermedia Using the World-Wide Web"

June 20 and 21 - Discussion of Paper 5
John W. Moore, Jon L. Holmes, Elizabeth A. Moore,
Nancy S. Gettys and Lin W. Morris
University of Wisconsin - Madison
"What Should a Chemical Education Journal Be in an Age of Electronic Information?"

June 22 - Papers for Session 2 will be available

June 24 - June 28 - Short Questions for Papers 6 to 9

July 1 and 2 - Discussion of Paper 6
Henry Rzepa and Omer Casher
Imperial College - London
"Recent Applications of Hyperactive Chemistry and the World-Wide-Web"

July 3 and 8 - Discussion of Paper 7
Stanley Smith and Iris Stovall
University of Illinois - Urbana
"Networked Instructional Chemistry"

July 9 and 10 - Discussion of Paper 8
Paul Kelter and James D. Carr
University of Nebraska - Lincoln
"Personalizing the Large General Chemistry Lecture Experience"

July 11 and 12 - Discussion of Paper 9
Gary Wiggins
Indiana University
"Use of the Internet in Teaching Chemical Information Courses"

July 15 - July 19 - General Discussion and Evaluation
The papers and discussion will be archived and available at the World Wide Web site (<http://www.wam.umd.edu/~toh/ChemConf96.html>) after July 19.

FUTURE ON-LINE INTERCOLLEGIATE AND INTER-SCHOLASTIC COURSES

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I. INTRODUCTION

One recent initiative of the ACS Division of Chemical Education's Committee on Computers in Chemical Education (CCCE) is the development of intercollegiate and interscholastic on-line courses. Such courses are intended to be collaborative efforts with course instructors at each school. In planning such courses the Committee solicits ideas and needs volunteers to serve on organizing committees and as course instructors at participating school.

Discussion of on-line courses will occur at an open meeting of the CCCE to be held at the BCCE at Clemson on Tuesday, August 6, 1996. Those unable to attend the meeting may send ideas and suggestions or volunteer to participate by contacting me. In the follow-

ing paragraphs, I will outline some of the characteristics and possible scenarios for courses.

The first course sponsored by the CCCE was entitled "Environmental and Industrial Chemistry" and was offered during the Spring 1996 semester. An article on this course appears elsewhere in this Newsletter.

II. STUDENTS

A course could be offered for credit or not for credit to:
A. A general audience of Students
B. Pre-High School Students
C. High School Students
D. Two-Year College Students
E. Underclass College and University Students
F. Upperclass College and University Students
G. Graduate Students
H. Some combination of the above.

III. SCOPE OF THE ON-LINE SEGMENT

The on-line segment might constitute: A. a small part of a traditional course, B. a major part of the course, or C. most or almost all of the course.

An example of situation A - The trial session of the course on "Environmental and Industrial Chemistry" was part of physical chemistry courses and featured a paper on flames. Only a few weeks were devoted to this segment. (See discussion elsewhere in this Newsletter.)

Examples of situations B and C - In the course "Environmental and Industrial Chemistry" participating course instructors had considerable latitude in structuring their local course. Some course instructors required considerable off-line activities - class meetings, preparation of papers, etc. Other instructors required little other than participation in the on-line segment.

IV. NATURE OF THE ON-LINE AND OFF-LINE SEGMENTS

A. Listserv, Bulletin Board and/or World Wide Web available for distribution of:
1. Student papers
2. Expert papers
3. Student Questions
4. Questions from authors of papers
5. Answers to questions
6. Discussion
7. More or less formal debates on specific issues
8. Assignments
9. Other resource materials, e.g. graphics, film clips, audio, and links to WWW sites.
10. Computer Assisted Instruction materials

B. Off-Line:
1. Textbook
2. Class meetings
3. Assignments
4. Discussion
5. CD ROM and other materials
In many of the participating schools the course on "Environmental and Industrial Chemistry" included A-1 to 6 and B-2 to 4.

A course might include traditional components (B-1 to

4) and provide only discussion and the answering of questions on-line (A-3, 5 and 6).

V. COURSE PLANNING

Central to the development of a course is:

A. A course Chairperson
B. A Course Organizing Committee - there may or may not be one.
C. Course instructors at each participating school are essential in the model we propose.

In the "Environmental and Industrial Chemistry" course the Organizing Committee defined the nature of the on-line segment. Course instructors were responsible for off-line activities - class meetings and discussions, the assignment of student papers, examinations (if any) and course grades. In addition, each course instructor had the responsibility for familiarizing his students with the e-mail system, the Listserv and the World Wide Web.

D. Students may or may not participate in the planning process. One interesting possibility is that students help define the kind of course which is offered. The course is then developed with the assistance of V-A to V-C.

VI. COMPUTER SERVICES - THEIR NATURE AND ADMINISTRATION

A. A Listserv, Listservs and/or a Bulletin Board
In the "Environmental and Industrial Chemistry" course two Listservs were established at Clarkson University. One (OLCC-FAC) was initially used by the Organizing Committee and at a later stage course instructors and expert authors were signed on. This was a private list. No one other than those I added was able to send or receive messages from the list. Besides being used by the organizing committee OLCC-FAC was used by course instructors and expert authors to exchange ideas, ask and answer questions and discuss various matters.

The other Listserv (OLCC-STU) was managed by George Long and me. It was a public Listserv (i.e. anyone could sign on, but the subscription had to be confirmed). Messages could only be sent or retrieved by subscribers. This list was intended for students and the authors of papers. Course instructors were asked to sign on but not participate in the on-line discussions. James Beard (the course chairperson and chair of the Organizing Committee) sent some announcements to this list. The list might have been moderated so that any message sent to the list was received by the list manager who then decided whether to distribute the message to the subscribers. Neither OLCC-STU nor OLCC-FAC was moderated.

B. A World Wide Web site (WWW)

In the "Environmental and Industrial Chemistry" course George Long managed the course website. The papers and much of the course information was distributed from this site. The papers and OLCC-STU discussion are archived at this site (<http://dirac.py.iup.edu/college/chemistry/chem-course/webpage.html>). While it is not essential that a WWW site be established, the presence of a site makes it easier to transmit papers, graphics and multimedia materials. The website manager controls information which is distributed via the site.

C. Access to e-mail and the WWW at each of the participating schools

Each student and course instructor needs to be able to access the appropriate Listserv and WWW.

VII. SOME ADVANTAGES OF ON-LINE COURSES

Offering a new or different course can be a formidable undertaking for an isolated teacher particularly if it involves the use of what may be new computer technologies. Few of us can afford to do this for one or a very few students. Bringing outside experts on campus may simply not be feasible.

Intercollegiate or interscholastic courses are collaborative efforts and can involve educators and outside experts assuming different individual responsibilities in producing a rich learning environment. Such courses provide a learning experience for teachers as well as students.

A. Some advantages for course instructors Provides an opportunity to: (1) collaborate with others in designing a course (2) interact with students, authors of papers and other instructors (3) involve experts (might be difficult because of geography, attracting experts to a course containing a very few students) (4) offer a course for a small number of students without having to devote an enormous amount of time (5) offer courses on topics which might otherwise not be possible.

B. For students Provides an opportunity to: (1) interact with other students, experts and other instructors (some from different parts of the country or world, some having very different points of view) (2) take a course on a topic which might not otherwise be available (3) collaborate with other students (perhaps even at different schools) in preparing papers or researching a topic.

VIII. WHAT NEXT?

The CCCE is prepared to ASSIST teachers in organizing on-line courses.

A course topic is needed - it could be General Chemis-

try, Environmental and Industrial Chemistry or anything else. One topic that was suggested at the BCCE meeting at Bucknell was "Careers in Chemistry". This seemed like a very good idea to me. As I visualize such a course, chemists in sales, management, research and development and teaching could talk about what they do and what opportunities exist in their fields. I believe upperclass chemistry students who are beginning to think about life after college would be interested in such a course.

Volunteers are needed to serve on an Organizing Committee and a Chair is needed. In the one course which has been offered, a Chair volunteered. We helped him to recruit a Committee. The course topic was selected by the committee after the committee was formed. (It does not have to be that way.)

The Organizing Committee will need to recruit course instructors at other schools. Authors of papers may be needed. Individuals are needed who are willing to manage the Listservs and Websites. The CCCE is prepared to assist in these recruiting efforts.

We are hoping to find a few good men and women who are willing to devote time and effort to organize courses. Please contact me (rosen@clvm.clarkson.edu) if you have ideas and wish to help OR come to the open meeting at the Clemson BCCE.

ENVIRONMENTAL AND INDUSTRIAL CHEMISTRY An On-Line Intercollegiate Course For Upperclass Chemistry Students Taught During the Spring 1996 Semester

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INTRODUCTION

During the summer of 1993 the Committee on Computers in Chemical Education (CCCE) sponsored the first on-line conference offered by the ACS Division of Chemical Education. At the conclusion of the Conference informal discussion of a number of topics continued. One suggestion which was made was that on-line intercollegiate courses be offered. Discussion of on-line courses (and conferences) occurred at an open meeting of the CCCE held at the 13th Biennial Conference on Chemical Education (BCCE) at Bucknell University during the summer of 1994. A number of useful suggestions were made. One