ESTABLISHING A UNIVERSAL CHEMISTRY NETWORK by Kenneth Ratzlaff, Chairman of COMP Division*

It has become increasingly clear to many of us that the chemical community must have a communications network. This might not be obvious to those who do not use a network. However, one rapidly becomes convinced upon observing how much a network is used by those who have one available.

I hope that during this year, the COMP division and the CHED division, both of whom have shown interest, will set up a prototype network for division members. With this memo, I would like to solicit more information and some opinions. Then we might be able to move ahead toward a proposal by summer and possible implementation of a prototype system by fall.

In the following sections, I have tried to list

(a) some of the possible applications that I see for the network,

(b) the characteristics which I think the ideal network should have and,

(c) some of the available options and how they fit the ideal characteristics.

This list is incomplete and may contain errors but is meant to serve as an initial attempt to formulate what is needed. I would appreciate receiving your comments regarding applications, characteristics, and options which you believe are most

important.

Some Suggested Network Applications

1. Transmission of messages. The entire chemical community would benefit from regular and convenient communication. in particular, committees could improve their operations. Persons who have networks available find that they prefer this method to phone calls in many cases because (a) they do not need to depend on the call going through, and (b) the message is left accurately.

2. Transmission of documents between collaborators. Manuscript drafts and data sets can be rapidly sent to research collaborators. Although the technology for handling technical symbols is not yet universally available, it is possible to pass drafts back and forth.' This is already frequently done by workers having this capability.

3. Electronic transmission of messages to organizations. If a journal editor had an electronic mailbox, reviews could easily be sent even though we might have a hard time passing final copies of technical manuscripts. Society program chairpersons could transmit program information to the Society office.

4. Maintenance of shared information. Division directories with names, addresses, phones, and mail codes might be made public (with a warning against commercial use). The Society programs could be listed as soon as they are finalized, and the tentative programs could *be* made available to

program chairpersons while in process.

5. Bulletin boards for announcements. A bulletin board could be maintained for public announcements with special areas for specific subjects.

6. Bulletin boards for individuals. In some areas, such as in electronics and microcomputer *use,* bulletin boards are used widely to help solve problems. One person might put up a message asking where one might get a chemical or to find out if someone else has solved a given problem, or even to find a good restaurant for a committee meeting. Other persons see this message when they log on and have an opportunity to respond.

Characteristics of an Ideal Network

1. It must be universally accessible by the chemical community, a Community which includes chemists in large industries, chemists in small consultantships, chemists in major universities, and chemists in very small colleges. The accessibility requirement would seem to exclude networks which are available to only people doing certain types of research (e.g., ARPANET or CSNET), networks which are available only to certain types of organizations (e.g., BITNET), or networks used only by certain subsets of users (e.g., USENET).

2. It must have the capability of transmitting mail, each individual user having an electronic mailbox. That mailbox could be located either on a central computer which is the hub for an entire network, or the mailbox could be in a local computer system if the

network primarily passes messages.

3. Enough file space should be available for the transmission of large manuscripts between collaborators or reviewers, etc. Bath protected storage (with several levels of protection possible) and public storage should be available.

4. The network should provide for direct communication between any pair of users.

5. Conferencing should be possible where a larger number of users log on to one discussion simultaneously.

6. There should be bulletin board capability. The bulletin board should be segmented by discipline and sub-discipline and allow any user to leave a question, announcement, or problem to which any other person can respond.

7. The ideal methods of connection should be <u>either</u> by toll-free call or by direct connection to one's local computer.

8. The cost of using the network should be low to the end-user. There are several possibilities. **A** small connect-time charge could be billed to the employer, the cost of the network could be borne by the institutions which use it, or it could be supported by one or more funding agencies eager to improve the quality of science in the country *(NSF,* NTH, PRF, DOD, etc.).

9. Transmission speeds at least to 1200 baud and preferably from 300 to 19,200 baud should be supported. The speed would depend on the lines available to an individual user or site.

<u>Networks Known to be Used by Chemists</u>

1. CHYMNET. This is a prototype hub-based network which

is now functioning. It was implemented through an NSF grant to the SERAPHIM program for which John Moore is PI. Software to achieve most of the goals (mail, conferencing, etc.) listed above runs on the Amdahl computer at the University of Michigan. I do not know what the potential is for expanding this particular implementation.

2. Commercial Information Utilities. CompuServe and The Source are the best known. These are available to anyone for a sign-up charge, a monthly minimum fee, and a connect-time charge. They allow mail and storage, have low-cost phone numbers, and include bulletin-board facility. They can be accessed only by phone at 300 and 1200 baud.

3. USENET. I believe this is a network of UNIX computers. The cost of supporting a leased line and the operating software is apparently borne by the individual computer -facilities.

4. ARPANET. A network which is available to users who hold DOD contracts. Apparently at Berkeley there is a gateway into ARPANET.

5. CSNET. Like ARPANET, CSNET is a restricted network, restricted to persons or departments performing computer science research.

6. BITNET. This is a network of universities using software provided by IBM

7. My understanding is that the costs are borne by each university which must run the software on its local IBM computer and pay the cost of a leased line to the nearest other

installation.

8. Microcomputer Bulletin Boards. Throughout the country there are literally thousands of public-access bulletin board systems. Most specialize in a specific group of users, either by geographic location or by subject interest. There is software available for setting it up. A proposal has been made that I set up such a system from one of our computers; we would *need* to add 2-3 telephone lines and the appropriate software. The disadvantage is *small* capacity. The advantage is that the user need only pay toll charges.

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