INTRODUCTION

The current rapid development of scientific knowledge makes it increasingly difficult for scientific research workers to obtain information relevant to their work. Even though libraries and similar institutions storing scientific information are making strong efforts to make information easier to access, it is doubtful if these efforts are at this time large enough to match the growing difficulties of obtaining information caused by the rapid growth of scientific knowledge.

In last year's panel session, we discussed methods to improve the organization and handling of information more from the point of view of the information professional. We heard about Medline and Medlars, how to download information from these systems such as the PaperChase system. Further, we became familiar with very important technical, educational, and legal aspects of electronic information storage and retrieval systems. Finally, we heard about specific linguistic techniques to organize the information in different science areas.

In this year's panel, our aim is more on methods and techniques which allow one to individualize the available information for the specific needs of an individual investigator. For this purpose one should study first the needs of scientific investigators. In a preliminary short study of academic research workers at MCV/VCU we found that research workers prefer to have their own system, as shown in Fig. 1. In the center of the information system is the research worker surrounded by his personal system. Searches are initiated in the personal system and when not enough information is available are automatically extended to outside sources. Other comments by these research workers included that the storage and retrieval methods should correspond to their methods of investigation, it must be easily changeable by the research worker and that it should be possible to store and retrieve any information any place and any time.

Much longer and more in-depth investigations of the needs of scientific investigation have been made studying for example the retrieval of information from external databases by life scientists. Such studies not only determine if this type of information retrieval is useful but also in what particular ways they should be operated.

Several methods are now on the market or under study which help the investigator to individualize the information stored in libraries and databases. Microcomputer networks are now being investigated where related information, extracted from outside databases, is put on different microprocessors on the same network. Investigators can in this way access easily related information from different microprocessors on the same network.

Different software systems are becoming now available which allow the scientific investigator to search commercial data bases without the help of a librarian. The major advantage of these new software packages is that one can access a large number of the different databases without learning the individual command languages of these systems. Further personal files can be created storing the retrieved information. Another advantage of these software packages is their relative independence from a specific hardware.

Following are the names and affiliations of the panelists, and their topics.

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RESEARCH ON END USER DIRECT ACCESS
TO MEDICAL BIBLIOGRAPHIC DATABASES

Direct access to online bibliographic databases is now possible for anyone with a terminal, telephone connection and password. In the early 1970's, it appeared likely that many people in the medical field would use available terminals to do some of their own online bibliographic searching. To see how well they would do, W. Sewell started an experiment, in the fall of 1974, at the University of Maryland at Baltimore. Terminals were placed in the Department of Pathology and in the School of Pharmacy, providing direct access to MEDLINE and other National Library of Medicine databases for the faculty, staff and graduate students of each group.
Traffic logs for nearly 6,000 searches between January, 1976 and December 1982 have been analyzed, including two studies in depth of 1976 through 1980. One is an overview of a ten percent sample of the total searches, showing the relationship between the approximately half of the searchers who identified themselves and the other half who failed to do so. The other study is a longitudinal examination of the 37 identified searchers who have done at least seven acknowledged searches over three years or more. The latter provided most details on successes, failures and complexity of the searches, and on subject areas covered.

Data on the kinds of searches frequently wanted by members of the two groups and their attitudes toward online searching were gathered through a questionnaire in the fall of 1981. We also conducted a follow-up study in the fall of 1982 in which we “corrected” problems found in 45 current searches by 38 people. In scheduled interviews, we asked the original searchers to evaluate the references we added. Our purpose was to learn from the users which of the problems we identified had the greatest effect on the outcomes of their searches.

Some of the results from these studies follow. From the questionnaire and the follow-up study we learned that users are well aware that they miss references online and when they do, they use other methods to find what they want. They do their own searches primarily for convenience. In the survey, 84% of searchers cited convenience as the first reason for searching by themselves. They learned from each other and do satisfactory subject and author searches using the simplest possible techniques.

In the retrospective study, problems with techniques occurred in 15% or fewer searches and proved to be much less important than problems with the vocabulary and structure of the databases, as will be discussed in more detail in the companion paper by Dr. Sewell. These users do well enough in their online bibliographic searches to continue to search.

**ISSUES IN END USER DIRECT ACCESS TO MEDICAL BIBLIOGRAPHIC DATABASES**

In connection with the research on end user direct access to medical bibliographic databases described in a companion paper by Sandra Teitelbaum, we identify several issues which should be considered by health scientists who wish to search such databases by themselves. These questions result from nine years' observations of several hundred pathologists and pharmacists averaging 1000 searches a year recently.

With respect to techniques, questions include: should the system to be used by menu-driven with prompts to lead the user through the programs interactively (as with Paperchase), should commands be simplified (as with Knowledge Index), should standard commands be learned, but only the essential ones (as with our end users), or should the end user know the system thoroughly to use it effectively?

With respect to intellectual aspects of the system, should the user express his question in his own words or does he gain more by using the vocabulary and intellectual structure provided for the individual system? Examples of success and problems of the end users we have studied will be used to illustrate advantages and disadvantages of the various approaches to the intellectual content of a system. How can the librarian help?

Other issues to be considered are most effective learning methods and user aids, costs of the various options, and evaluation of the quality of one's own search.

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KNOWLEDGE INDEX AND DIALOG:
ONLINE INFORMATION SERVICES FOR THE HEALTH SCIENCE PROFESSIONAL

Traditionally, online searching has been performed by librarians and other information intermediaries, but more recently physicians, pharmacists, nurses, and other health science professionals are becoming online searches themselves. Knowledge Index is specifically designed for the home user professional, and includes MEDLINE in addition to thirteen other databases. Medical practitioners and researchers are also accessing DIALOG Information Services, where Excerpta Medica, Biological Abstracts, Science Citation Index, Chemical Abstracts, International Pharmaceutical Abstracts, Hospital Literature Index, MEDLINE, and Pharmaceutical News Index are all available in one software system, along with 160 other databases in a variety of subject areas. With no minimum usage or subscription fees, terminals, personal computers, word processors, or microcomputers may be used for accessing DIALOG and Knowledge Index, and print copy document delivery service is also available. Sample searches from both online services will illustrate system capabilities and command language.
PERSONAL RETRIEVAL OF INFORMATION FROM DATA BASES

Sci-Mate™, a new software for microcomputers, will be discussed. Its Universal Online Search package will be emphasized since it permits retrieval of information from MEDLINE, DIALOG, BR5, SDC and ISI without the searcher's having to learn the individual command languages of these systems. Also discussed will be Sci-Mate's Personal Data Manager package, which enables the user to create a personal, mini data base of any text file.

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TO DOWNLOAD OR NOT TO DOWNLOAD ONLINE SEARCHES

This talk will discuss some of the considerations involved in downloading online search results using a microcomputer. The advantages include the ability to reformat and repackage search output as well as to send it to the user electronically. The disadvantages include the need for special, and probably expensive, equipment, and the additional time required to complete the process which may lead to decreased user satisfaction and searcher productivity. As with most processes, there are tradeoffs.

Fig. 1: Personal Information System