A Systematic Approach to Current Awareness and SDI

ROGER L. MEYER, AMY J. MESKIN, JOHN J. MRACEK,
JAMES H. SCHWARTZ, and EMMA C. WHEELIHAN
Celanese Research Co., P. O. Box 1000, Summit, N. J. 07901

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The approach permits, in a single shot operation, the simultaneous production of three services, i.e., a weekly *Review* of journal and government literature, a weekly *Patent Bulletin* and a manual SDI based on 125 profiles. This total current-awareness service utilizes, in addition to profiles, 10 channels of communication whereby the technical information staff takes cognizance of the information needs of the research staff in order to optimize information dissemination. These channels are described as well as the services, together with their objectives and physical presentation. Indication is made of operational statistics, relevancy achieved, cost and man-power requirements, and build-up of broad retrospective searching capability on projects. The philosophy underlying the approach is discussed with an indication of reasons: flexible integration into R&D environment; input through free association not only of keywords, but of concepts, ideas, and other facets related to users' interests; flexibility in responding to specific user needs and idiosyncrasies; presentation of salient data directly related to projects; rapidly modifiable information base; enhanced sense of involvement of the technical information staff with the research staff.

Of the many support functions that serve the needs of the staff of the Celanese Research Co., the technical information function plays an essential partnership role in the research and development process as reported in a previous paper.[5] Current awareness services and selective dissemination of information (SDI) are among the many operations that characterize this function. They started more than a decade ago with the production of two weekly alerting publications, *Review of Current Technical Literature* and *Patent Bulletin*, which are the result of scanning and extracting information from journals, government reports, and patents from the U. S. and nine foreign countries. Although these two services satisfied our requirements for interdisciplinary information, it was realized that we also needed a system catering information to personal and specific profile interests. As a result, in 1967 we started a formal manual SDI service for the journal, government, and patent literature on the basis of projects and profile interests of the 125 research staff members active at Summit, N. J., location of the Celanese Research Co.

The essential steps in this current awareness and SDI program are diagrammed in Figure 1, from which it can be seen that our SDI service is implemented at the same time that literature is scanned, evaluated, and analyzed for the *Review* and the *Patent Bulletin*. Thus, the three services are fused and produced through a single shot operation. A more detailed description of this total current awareness service is given in later sections. A system using one input for many outputs has also been described by Skolnik.[9]

OPTIMIZING KNOWLEDGE OF INFORMATION NEEDS

We feel that the first duty of an information center is to acquire a thorough knowledge of what the research groups are doing and plan to do. We, therefore, try to make certain that all possible means of input for arriving at an accurate and complete perception of information needs are utilized.

We also believe that there is no efficient current awareness service without dialogue on information needs between research workers and technical information staff. This dialogue should be permanent because it must bring to the information specialist a continuous flow of data on the activities of the several areas to be served. It is considered that our manual SDI system encourages this "dialectic" interchange and, as a result, leads to an increased involvement of the technical information staff with the technical and scientific personnel. This involvement is vital for optimizing knowledge of information needs and the success of the services.

To accomplish these objectives, many media, shown in Figure 2, are involved:

Profiles. Each member of the professional staff is asked to fill out a questionnaire on which he indicates specific interests related directly to his research project and his more general interests. These profiles provide the input for an annual computer-produced keyword index, which is used as one of the tools in scanning for SDI. The index is issued in two parts: first, an alphabetical listing of approximately 800 keywords with descriptive phrases, corresponding to profiles and projects with names of interested staff members following each

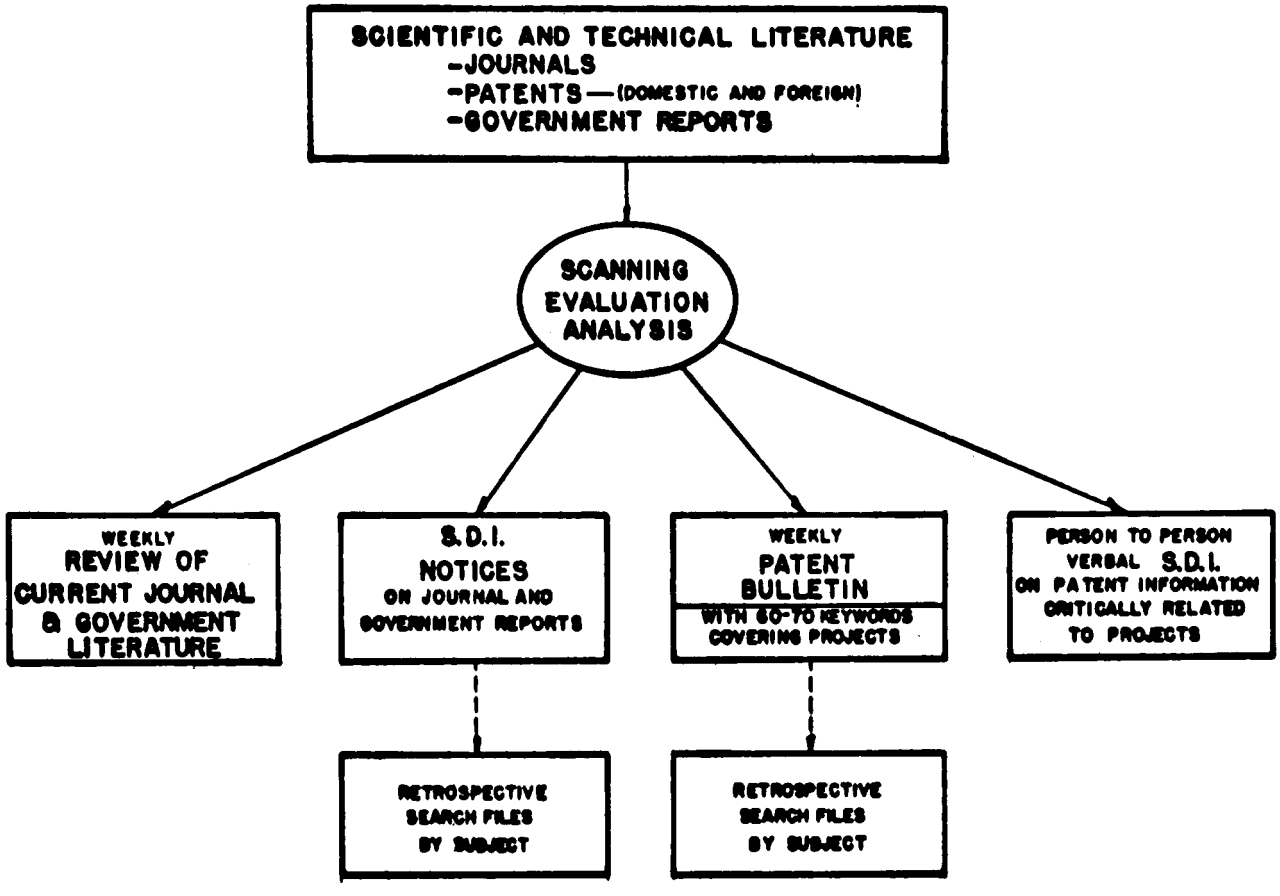


Figure 1

entry; second, an alphabetical list of individual scientists' names with their information needs. Profiles for professional newcomers are arranged at the time of a guided tour of the Technical Information Center, which is part of an orientation program. The new employee is interviewed personally by a technical information section representative who inquires into his research interests for input into the current awareness program. Profiles are brought up to date formally once a year by submitting to each staff member his current profile for his perusal and updating. The unstructured profiles, thus submitted, are then analyzed and processed by a technical information staff member for inclusion in above mentioned listing. All profiles are also updated informally on a continuing basis.

The following communication channels are used to reinforce and complement information obtained through profiles:

Periodic Meetings with Section Heads. Periodically, the leader of each research section meets with the staff of the technical information section for an informal review of current research projects and an outline of the kind of information to be directed to each scientist within his group.

Research Review Meetings. Members of the technical information staff attend formal review meetings held regularly by the research sections within the company. Status of project needs for incorporation into the alerting services are ascertained at these sessions.

Contact Men. Key scientists throughout the laboratories inform the technical information section of immediate changes or additions in projects to be reflected in subjects covered by the current awareness services.

Technical Information Advisory Committee. This committee is made up of at least one representative from each research section. A meeting of the technical information staff with this committee is held quarterly. In addition to discussing items related to library functions, the committee members make suggestions for refining the scope and format of the alerting services.

Newcomers' Meeting. Quarterly meetings of the staff of the technical information section with professional employees who have joined CRC during the previous three months provide further ideas for input into the current awareness program.

Dialogue with Individual Research Workers. Each member of the technical information section communicates regularly with laboratory chemists and engineers to learn up-to-date information needs.

Feedback from SDI Forms (which will be described later). The lower portion of the SDI notices provides space for the research staff to indicate profile changes and make comments on the material received.

Requests for Literature Surveys. Requests for retrospective literature surveys often reflect new interests, which are incorporated in the current awareness and SDI services. These searches are implemented on the basis of direct communication with the requester who usually submits a detailed questionnaire describing his needs.[8]

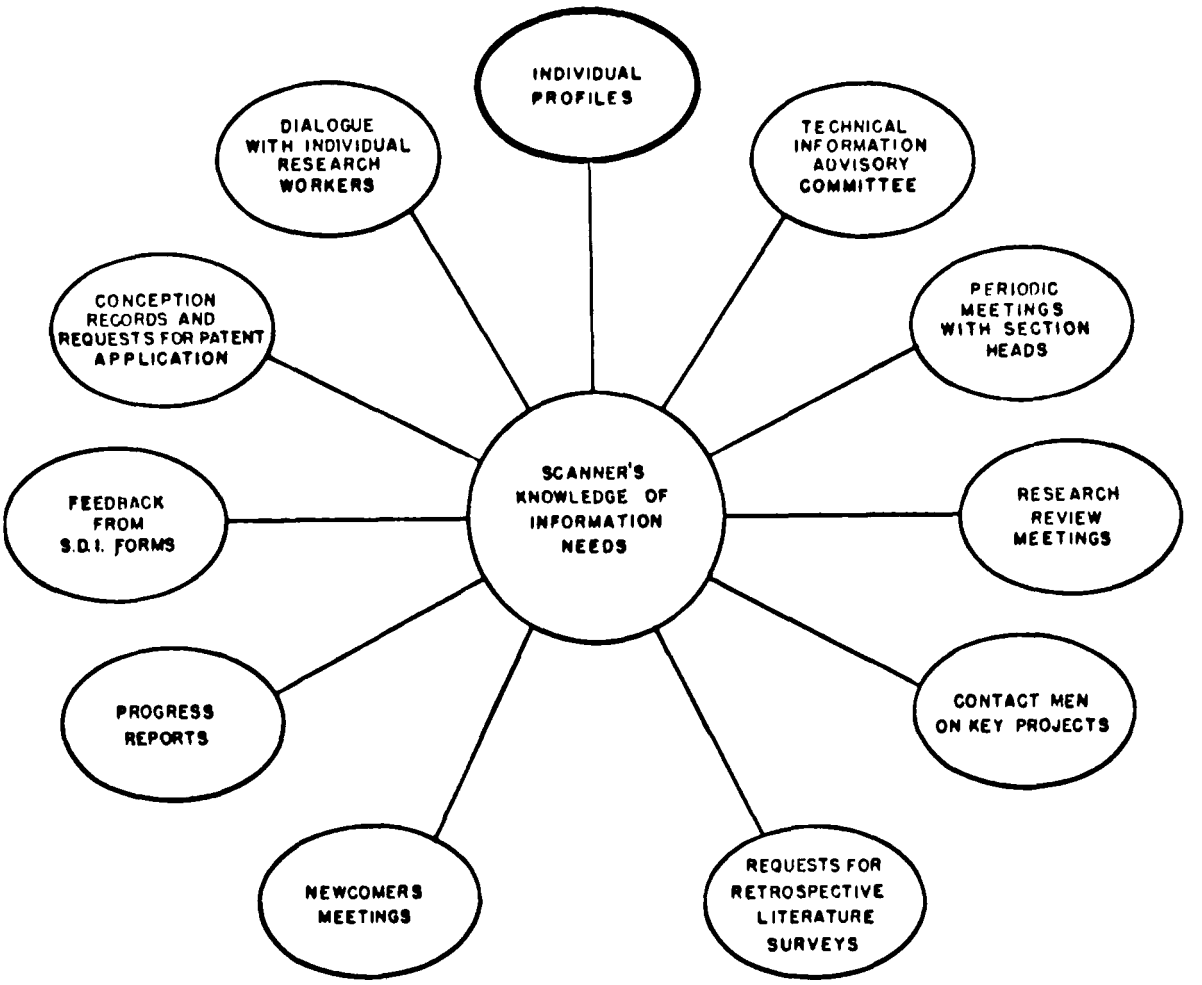


Figure 2

Conception Records and Patent Applications. Conception records describing new ideas by research personnel and requests for patent applications are examined for new concepts and interests.

Progress Reports. Reports issued monthly by research directors are scanned to determine current project needs.

DESCRIPTION OF THE SERVICES

Journal Literature and Government Information. Current awareness services in this area have two objectives:

To provide an express communication service on items critically related to projects. This is achieved through a systematic manual SDI service based on profiles of interest. As stated earlier, the scanning and analyzing of literature for the *Review* and for SDI are performed concurrently as per Figure 1. Statistical data on this operation are given below under a separate section. SDI information is communicated to the research staff the day it is received in the library and does not await the publication of the weekly *Review*. A typical SDI notice is shown in Figure 3.

To satisfy the interdisciplinary needs of the technical and scientific staff and to provide current information in areas of peripheral interests. This is accomplished by the weekly *Review* covering the entire range of research interests at Celanese.

Both *Review* and SDI are produced within the following parameters:

All publications are processed within 24 hours of their receipt in the library.

Just as the scanning for the *Review of Current Technical Literature* and SDI is done simultaneously, so is the physical production a one shot operation, i.e., as the SDI notices are typed, they are transferred to the master copy for production of the *Review of Current Technical Literature*.

Review and SDI notices contain references with abstracts or extracts from an article together with bibliographic data.

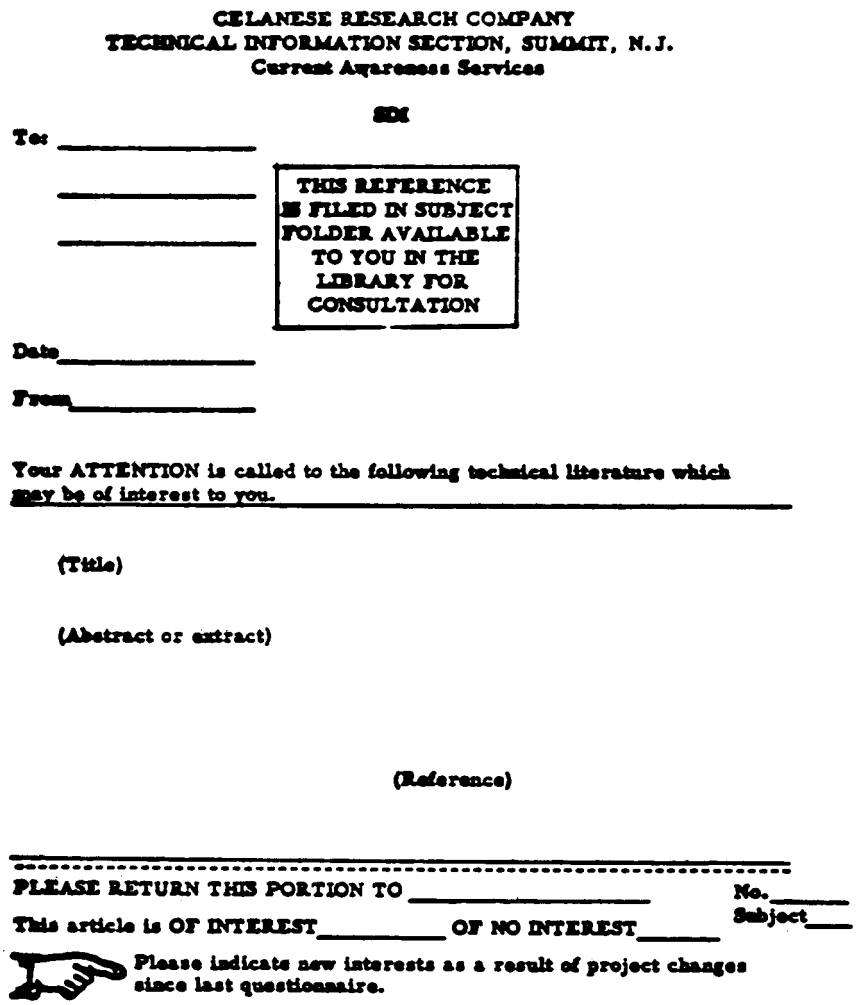
Each issue of the *Review* contains 40 to 50 pages and approximately 250 to 275 annotated items from journal literature and government reports.

The *Review* is organized according to the following broad subject headings: trends in business and technology; polymer chemistry; plastics technology; coatings, dyes, fibers, and textiles; chemicals; management-R&D-economics.

Literature surveys completed and in progress are highlighted on a colored page.

450 copies of the *Review* are produced for distribution to the research staff at Celanese Research Co., Summit, and the operating companies and their affiliates abroad.

Patent Information. Through the awareness services in the area of patent information, we try to achieve three objectives:



CELANESE RESEARCH COMPANY
TECHNICAL INFORMATION SECTION, SUMMIT, N.J.
Current Awareness Services

SDI

To: _____

_____

_____

THIS REFERENCE IS FILED IN SUBJECT FOLDER AVAILABLE TO YOU IN THE LIBRARY FOR CONSULTATION

Date_____

From_____

Your ATTENTION is called to the following technical literature which may be of interest to you.

(Title)

(Abstract or extract)

(Reference)

PLEASE RETURN THIS PORTION TO _____ No._____

This article is OF INTEREST_____ OF NO INTEREST_____ Subject____

Please indicate new interests as a result of project changes since last questionnaire.

Figure 3

To satisfy specific information needs related to research projects. This is accomplished by the weekly *Patent Bulletin* in which abstracts of patents are arranged according to specific Celanese interests and by including an index of 60 to 70 keywords, which gives a quick entry into the subject material related to projects.

To fulfill interdisciplinary requirements. This is achieved by alphabetical subject arrangement of patent abstracts of the *Bulletin* within broad Celanese subject categories, which provide an easy method for scanning topics of general and peripheral interests.

To satisfy specific and critical personal profile requirements; this is carried out by a SDI program based on systematic person-to-person verbal contact (10 to 15 contacts per week). Patent information critically and directly related to projects is brought to the attention of and discussed with key people. This is an extension of our above mentioned keyword index, whereby we reinforce our dialogue with the staff. Selected patents communicated in this fashion do not await the publication of the weekly *Bulletin* but are communicated immediately to appropriate parties.

The physical production of the *Patent Bulletin* is based on the following parameters:

Incoming patent information is processed within the week of receipt for distribution the following week.

Each issue of the *Patent Bulletin* contains 50 to 60 pages covering patents from the U.S. and nine foreign countries.

The *Bulletin* is arranged in five broad subject sections, i.e., polymer chemistry, plastics technology, fibers and textiles, coatings, and petrochemicals.

400 copies of the *Patent Bulletin* are distributed to the research staff at Celanese Research Co., Summit, and to the operating companies.

PHYSICAL PRESENTATION

We are aware of the psychological impact on the user of appearance and format in which current awareness services are delivered. Suggestions from the above mentioned technical information committee corroborated the often overlooked importance of physical presentation, so we use various techniques to ensure that the presentation of the services is favorably received, e.g., easy recognition of the *Review* by its blue cover; of the *Patent Bulletin* by its red cover; of the SDI forms by their yellow color; the clear print and layout allowing for easy legibility, etc. We also want to make sure that the alerting services may be readily distinguished among the flow of papers that daily crosses the research worker's desk.

OPERATIONAL STATISTICS, RELEVANCY, AND USER STUDY

An average level of 76% relevancy has been achieved in 1969 on the basis of interest or no interest feedback

through return of perforated slips attached to SDI notices. The services are based on scanning 600 to 700 journals, four U.S. Government research publications covering together approximately 250,000 report abstracts a year, and approximately 240,000 patent abstracts from the U.S. and nine foreign countries. The scanning results in the publication of 12,000 to 13,000 journal and government references per year in the *Review* and 25,000 abstracts a year in the *Patent Bulletin*. The number of SDI notices related to journal, governmental, or patent references amounts to 8000 to 9000 per month.

An in-depth user study of the current awareness services has been conducted in February 1970 with a view to formally assessing their readership and reliance patterns, their impact on research projects and their over-all value to the staff. This study will be the object of a separate paper giving a full account of the results.

COST AND MANPOWER REQUIREMENTS

The services, including establishment of profiles, are operated by a staff of 2.25 professionals and two assistants for support. We measured and found that the package of the three services costs the equivalent of 40 minutes per week of the average professional's time. As reported elsewhere, the intellectual input and the training required to scan a wide range of technical subjects is probably the greatest difficulty in a manual system.[2] We feel that the scanners should have the mental acumen that enables them to contribute effectively to the information transfer process on the basis of a strong knowledge of information needs of the R&D projects and of the individual research workers. Here are some characteristic qualifications:

> Eagerness and enthusiasm to follow up on information needs.
> Salesman's urge to market information.
> Capacity for information retention and recall.
> Interests cutting across disciplines and generalists' outlook.
> Capacity for associative thinking.
> Open-mindedness to the individual research worker's information needs.
> Above average ability in speed reading.
> Keen intellectual curiosity.

BUILD-UP OF RETROSPECTIVE SEARCHING CAPABILITY

Copies of SDI notices are added to subject files in order to build up retrospective searching capabilities on projects. Essentially all items that have been sent out by SDI or patent abstracts that have been assigned keywords are placed in these subject files. There are 200 different subject folders related to journal and government literature and 500 to patent literature. This searching tool is used as a quick means for staff members to check up on what was going on in a field related to a specific project over, say, the past one to three years. If needed, these subject folders are also used as one of the many back-up tools for the production of comprehensive literature surveys that always need a critical investigation of other information resources and systems available inside or outside our information center. We explained and described the performance and policies on how we produce this type of critical literature survey in a separate paper.[5]

UNDERLYING PHILOSOPHY

Manual SDI systems have been reported[2, 3, 6, 7, 10] and some of the published literature indicates reasons underlying their usage.[2, 10] For instance, in connection with SDI systems, Davison suggests that "in an age when it is very commonly believed that the only way to handle data is to use large and expensive computer systems, it is possible to do the same work with much more limited resources."[2, 4] On the basis of his own experience he comments, "there is a growing evidence that possibly it may even be better this way."[2, 4] Furthermore, Van Allen and Gibson report,[10] in regard to G.M.'s system on automotive safety information, that "we can retrieve information more efficiently—which means faster, at less cost, and in a manner more responsive to user needs through the manual means now employed than we can by using a computer. The same is true of the SDI system. Our users' profiles change rapidly from very specific to quite general, and better service is provided by interposing a human mind between the raw material and the user than in any other way."

On our part, we have experienced the following cogent reasons underlying our system:

> The manual system for SDI is amenable to a high degree of *integration into a R&D environment* and lends itself ideally to streamlining according to ever-changing needs and projects.
>
> It provides intellectual input, i.e., the analysis, evaluation and selection of relevant items not only through keywords, but through intelligent and imaginative association of concepts, ideas, and all possible facets related to individual interests. It also is able to take into account the users' idiosyncrasies.
>
> It can be performed on an unrestricted person to person relationship in contrast to the limitations imposed by computer systems. This is very important since the problem of relating current information to industrial users is, first of all, a sociological problem in which person to person communications play a predominant role.
>
> It allows for prompt response of feedback from research staff asking for quick readjustment. It is our experience that such readjustments are needed constantly and in many cases also involve adjustments to users' personality. In this sense, the manual system allows for thoroughness as well as flexibility in responding to users' specific needs.
>
> It presents the technical man with an extract of salient data directly related to his project and/or individual need. In addition to title input and bibliographic details, this gives him an increased opportunity to judge the relevancy of the information before sending for the original literature.
>
> It allows for using a highly selective specialized information base modifiable at will according to changing needs. Such a base is more adaptable to specific and changing requirements of a given R&D environment than broader based computer tapes commercially available.
>
> It promotes an enhanced sense of involvement of the technical information staff with the research staff. It allows direct lines of communication between users and information sources and brings the Technical Information Center into partnership with research.
>
> With a staff of approximately 125 professionals, we are small enough to perform effectively a personalized service involving a great deal of face-to-face communication.

In a recent M.I.T. report,[1] Allen stated that "to date, attempts to automate the transmission of scientific and technological information have been most notable for their

failure. The reason for this does not lie in any lack of attention or inadequate effort allocated to the problem, since very large sums of money have been expended on storage and retrieval systems for scientific and technological information. Rather, it is due to the nature and complexity of the information, itself, and to the uncertainty and *very personal nature of each user's needs*." The objective of our manual system precisely is to cope better with the complexity of the information and to cater to personal needs of users. On the one hand, the direct involvement of scanners in the evaluation, dissemination, and user feedback makes them a partner in research and allows for a better understanding of the nature and complexity of the information needed. On the other hand, their direct involvement with the above described media, also summarized in Figure 2, gives them the opportunity of optimizing knowledge of the very personal nature of each user's needs and of participating more effectively in the information transfer process.

THE FUTURE

The above mentioned user study, the results of which will be published separately, confirm that the expectations inherent in our previously mentioned objectives have been realized. Our system is the result of a growth achieved over the years through adjustments to changing needs. In the future, we will, of course, maintain the attitude and motivation favoring such dynamic growth and permitting adaptation of the system to changing circumstances. Also our system design activities will continue to maintain careful evaluation programs both in terms of new developments in the field of information science and needs of the Celanese Research Co. For instance, the following parameters will continue to be under constant surveillance for comparative studies:

Cost and quality of manual scanning and input.
Cost and quality of computer scanning and input.
Cost and quality of outside SDI services.
Cost and scope of outside computer tapes with information base used internally.
Cost of man-Computer interface.
Research staff's acceptance of computer systems and printouts.
Currentness of computer tapes and processing.
Consistency and relevancy yardsticks achieved.
Results of pilot computer operations using commercial computer tapes.

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User Study of Current Awareness and SDI at Celanese Research Company

ROGER L. MEYER, AMY J. MESKIN, JOHN J. MRACEK,
JAMES H. SCHWARTZ, and EMMA C. WHEELIHAN
Celanese Research Co., P.O. Box 1000, Summit, N. J. 07901

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This paper presents the results of a user study conducted in February 1970 with a view of assessing the usage of and needs for current awareness services at Celanese Research Company (CRC). These services, which consist of a weekly *Review of Current Technical Literature*, a weekly *Patent Bulletin*, and Selective Dissemination of Information (SDI), have been described in a previous paper.[10] The study was carried out in line with our permanent dialogue with the research staff, the importance of which was stressed in the same paper. Apart from obtaining information for assessment of needs and usage, we also wanted to measure cost effectiveness of the services and let the research staff determine their value for research projects. We also wanted to know more about the informational behavior of the research staff so as to reinforce further the technical information staff's involvement with the research teams. This is in line with our belief that in order to achieve effective permanent person to person