STAR, as they did before the centralized system was set up." The advantages of the Multiterm indexing used in this computerized retrieval system are stated to be, computer-orientation, high information content, unique clarity of communication, inherent internal consistency, and high retrieval efficiency.

At the 160th ACS meeting in September 1970, a symposium was held on the "functions and contributions of the industrial information center." One paper[5] from that symposium gives some indication of the problem facing segments of the scientific community, "the National Federation of Science Abstracting and Indexing Services lists over 1800 (indexing and abstracting services) in 40 countries in its current edition. A more recent survey of Federation members (which includes *Biological Abstracts, Chemical Abstracts, Engineering Index,* etc.) shows that the member services alone will produce over 850,000 abstracts and citations this year...." To assist the chemist in reading the appropriate abstracts, industrial organizations have developed current awareness services such as the one at the Dow Chemical Company[6] which is based on internal information and *Chemical Abstracts.* Bowman and Brown[6] state that "the greatest impact these services have on an organization is one of cost. It costs us (Dow) about $100,000 a year to provide the services we mentioned...."

Another indication of the cost to the producer of information services can be gained from the recently announced $12.8 million National Science Library to be built in Ottawa by the Canadian National Research Council. According to the report in C&EN (Sept. 6, 1971), the Library "will fill requests for research information, provide computerized abstract scanning services, compile information from 12,000 periodicals, and maintain a pollution data bank and a list of federally supported research projects."

The industrial information center can paraphrase the words of Samuel Johnson, "Knowledge is of two kinds: we know a subject ourselves, or we know where we can find information upon it" to say that the center has two functions: to have the information available on site and to know where to obtain the needed information readily.

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Utilization of Terse Conclusions in an Industrial Research Environment*

IRVING GORDON** and RUSSELL L. K. CARR
Research Center, Hooker Chemical Corp., Niagara Falls, N.Y. 14302
CHARLES L. BERNIER
State University of New York at Buffalo,
Buffalo, N.Y. 14214

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Terse Conclusions are used at Hooker Research Center by technical and management personnel as concise report surrogates, as an internal awareness mechanism, and as the key components in a Report Header Sheet System. A Terse Conclusion is concerned with the meaning of a document rather than the subject scope, as in an abstract. A Terse Conclusion is written for every project in a heterogeneous report. Weekly compendiums of Terse Conclusions, which have replaced abstracts at Hooker for Progress Reports, are circulated to the entire staff. These Terse Conclusions are also intended to aid in management decisions.

This paper describes use by the Hooker Research Center of Terse Conclusions to improve communication at all levels and to reduce the amount of reading.

Among the various representations, or surrogates, for the full text of a document are indicative abstracts—which indicate the general content of the document without data, informative abstracts—which include specific data, extracts, reviews, textbooks, annotations, summaries, precis, and the like. A kind of surrogate recently reintroduced is the Terse Conclusion. It closely resembles the aphorism of Hippocrates.

Document surrogates are essential in most information-retrieval systems. An adequate document representation or surrogate permits the user to make the same decisions as if he were using the complete document.[1-5]

Despite recent advances in information/computer science, the user of today's literature has an almost impossible task in keeping abreast—even in a narrow field. Organized bibliographic citations are unsatisfactory because the primary literature is often difficult and costly to retrieve—and is just as voluminous as before. Detailed abstracts are often too voluminous for rapid perusal, and they frequently hide the main forte or conclusion of the paper. A possible solution to this reading problem is the Terse Conclusion. Adequate document representation is still an unresolved problem. The correctly phrased Terse Conclusion (from which we can arrive at proper decisions concerning the status of a research project) can be an efficient report or document surrogate.

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**To whom correspondence should be addressed.

Table I. Biomedical Terse Conclusions—Sucrose Consumption and its Cardiovascular Effect[8]

Excessive sucrose may alter lipids in human serum in a way to predispose to atherosclerosis (*27*).

In patients with normal glucose tolerance, sucrose is a potent lipemic agent as compared with starches (*59*).

Increase in dietary sucrose, well within the range found in current human diets, can produce increases in serum cholesterol (*58*).

Large amounts of sucrose nullified the hypocholesterolemic effect of safflower seed oil (*45*).

Serum cholesterol in rats was relatively elevated and increased with age in the group receiving white sugar (sucrose); in the group receiving white sugar plus Cr or brown sugar, they were low for both sexes (*36*).

Excess sucrose may influence development of maturity-onset diabetes mellitus (*27*).

Sucrose is a dietary additive consumed in the U.S. in amounts of 2 lbs. per person per week (*59*).

A high consumption of sucrose is an important factor in cause of myocardial infarction and peripheral arterial disease (*14*).

Sucrose is an important cause of heart disease (*59*).

Reference numbers are from the *Newsletter of Biomedical Terse Conclusions* and are used here to show the exact appearance of Terse Conclusions.

A comparison of the Hooker AN-2Y-3X and A4-2Z-9Y bleaches has been completed.

Figure 1. Short abstract

The morphology of the resin 4XA particles formed in the early stages of polymerization is being investigated because of the significant role it plays in determining the morphology of the finished polymer particles. We have utilized several isolation procedures, none of which gave particle sizes predicted by the literature, indicating that the particles may be distorted during the isolation procedures.

Figure 2. Example of an average indicative abstract for a report

Mace, consisting of 2-chloroacetophenone, kerosine, 1,1,1-trichloroethane, and Freon may cause skin burns around the eyes, corneal scars, and reduction in vision.

Figure 3. Terse conclusion example

Attempted automated production of abstracts dates back almost 15 years.[7] This field is still an object of study.[9] Automated abstracting requires input of the document in machine form. Most of the abstracts used today are produced manually. A useful Terse Conclusion that can serve as an efficient surrogate for a report or an article, however, can only be created at present by the author or an authoritative reader.

Terse Conclusions are best defined by actual examples. Table I lists some Terse Conclusions drawn from a Biomedical Newsletter illustrating the relation between sucrose consumption and its cardiovascular effects.[8] Notice the integrating effect of reading the Terse Conclusions in Table I and the fact that obtaining the same result from the original papers or even the abstracts would be much more time-consuming. If several hundred Terse Conclusions were involved, obtaining the same result from reading the original documents would be impossible. It is anticipated that most Terse Conclusions can serve as efficient surrogates for documents unread because of the shortage of time. It is better to be informed by a Terse Conclusion than to remain completely ignorant of the document because there is insufficient time to read it.

Hooker Research was introduced to terse conclusions by a short course on the subject given by Bernier at the State University of New York at Buffalo. We were intrigued by its possibilities and decided to experiment with its use in our written report system. This consists of monthly reports written by research chemists, condensed reports written by supervisors and project coordinators, summary reports written by section managers and managers, and finally an over-all summary report written by our Vice President of Research, D. B. Merrifield. The reports by the chemists and those by the project coordinators and supervisors receive wide circulation. We thought that good Terse Conclusions would make it easier for all of the professional staff to keep in touch with all projects underway in research.

Up to this time, all reports had a header sheet giving the usual information: project name, account charge number, date, authors, distribution, and a short abstract. The abstracts varied widely in utility, for example, from Figure 1, which tells nothing, to much more useful but somewhat lengthier versions, such as in Figure 2.

We introduced use of Terse Conclusions (Figure 3) to our project coordinators and supervisors who then introduced it to the chemists. After a trial period of about three months, we reviewed our program and consulted with the project coordinators and supervisors on this use of Terse Conclusions. Since that time we have used terse conclusions for over a year. During this period, we attempted to provide feedback to the authors on the usefulness of their Terse Conclusions and to provide suggestions for improvement. Although some progress has been made, we still have a way to go.

The report header sheet is a component in our internal information system which also includes microfilm and computer files of keywords of reports. The keywords are extracted by the author from the Terse Conclusion, but the keywords may also include more generic headings and specific structures not included in the terse conclusion.

The combination of Terse Conclusions, keywords, and citations for each report makes possible the application of an information retrieval system which operates utilizing a combination of citation indexing (references), keywords, and Terse Conclusions. A terse statement of the objective for the research project which leads the progress report is also a key component of our system's approach to internal literature.

To evaluate the usefulness of Terse Conclusions in our system, a questionnaire was sent to all members of the Hooker Research staff, and the returns were analyzed (Figure 4). Of the 79 questionnaires sent out, 90% were returned; 55% of the questionnaires had added comments. In summary, the Research staff expressed that the utility of the Terse Conclusion was between moderate and significant on a scale that also included "Small value and utility" and "No value or utility." Terse Conclusions were determined to have value over the brief abstracts formerly used. Terse Conclusions were also deemed of value as an awareness mechanism and as report surrogates to management. Many of the specific comments on use of Terse Conclusions favor the rewriting of poorly written Terse Conclusions with the elimination of acronyms and jargon.

Question 1. A terse conclusion which can act as a substitute or surrogate for a project outlines the meaning of a project in one or two sentences. The value of our present terse conclusion over the former system for reports and memos where no terse conclusion or abstract was used is of:

Significant value and utility ——
Moderate value and utility ——
Small value and utility ——
No value or utility ——

Question 2. The former brief abstract which often expressed the project as "The reaction of A and B were studied" versus the terse conclusion which would state—"A and B react to form C (an efficient antidegradant) in 90% yield utilizing catalyst X and a temperature of 100°C" indicates that the worth of the terse conclusion over the brief abstract is of:

Question 3. The present report or memo header sheets require the listing of significant references (research notebooks, memos, progress reports) which are used as citation indices to these references during retrieval. These references are of:

Question 4. The new report or memo header sheets require the listing of important keywords. It is logical to expect the author of a given report to outline the necessary keywords with high efficiency and facility. These keywords will be put into machine (computer) form and used for computerized retrieval of the author's report or memo. These keywords are of:

Question 5. The header sheets are combined at weekly intervals into a terse conclusion compendium and issued to the entire staff. These terse conclusion collections serve as an internal SDI (Selective dissemination of information) and could be utilized by management and supervision to follow the progress of any project and as aids to decision making.

a. The terse conclusion collections as SDI (to the entire staff) are of:

b. The terse conclusion collections as report surrogates to management are of:

Question 6. My overall opinion of the terse conclusion header sheets and the terse conclusion collections is that they are of:

Question 7. Please write any suggestions or constructive comments that you may have in this area:

Figure 4. Terse conclusion questionnaire (the value and utility portions of Question 1 also apply to Questions 2–6 below)

In conclusion, although we are still modifying Terse Conclusions to fit our own system, we use well written Terse Conclusions as: efficient report surrogates, components for communicating information to the entire staff, and key components in a computerized information-retrieval system.[6]

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Pharmaceutical Industry Viewpoint of Wordage Problems—Amount, Languages, and Access*

L. N. STARKER**
Science Information Services, Warner-Lambert Research Institute, Morris Plains, N. J. 07950

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From the viewpoint of U. S. pharmaceutical information groups, the major portion of the literature of interest is written in English. This holds true even for an important percentage of papers written for, and published in, journals from non-English speaking countries. The language problem is further simplified by the practice of many publications of offering an abstract or summary in English for each paper published. Obviously, these brief condensations are not enough to yield the meat of a report, but coupled with even a meager knowledge of the language, they are often sufficient for all but the most exacting needs.

Finally, when complete and exact translations are required, use is made of professionals who are expert in the languages needed. The policies of most pharmaceutical companies vary from the maintenance of in-house translation staffs that are expert in the most common languages, to having all such work done by outside service bureaus that specialize in scientific translations.

Some organizations also maintain lists of their own

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** Deceased.