Terse-Literature Viewpoint of Wordage Problems—Amount, Languages, and Access*

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Document-retrieval and selective-dissemination systems, while aiding access to documents, do not solve the problems of too much to read in the limited time available nor the problem of reading many foreign languages. New literatures, proposed to aid in solving these three problems, include terse conclusions and updatable handbooks or computer stores of data. Terse conclusions may average 1% of the length of papers, act as surrogates, reduce backlog reading, speed use of literature, aid memory and research, be written rapidly, and published inexpensively.

Imagine a perfect document-retrieval system. It instantly provides only relevant documents and doesn't miss any relevant document. It costs the user nothing except his time. Although such a system solves the problem of ready access, it fails to solve the problem of too many words to read in the limited time the user has available and fails to solve the problem of too many languages the user cannot read. If we cannot read all documents supplied by the systems we now have, then why should we build a perfect system that deluges us with even more documents?

The continuing existence of these three problems of amount, languages, and access is adequately attested by statements made by responsible individuals throughout the past quarter century.[1–17]

We face the following language problem: in biomedicine, half to three fourths of the documents supplied by the perfect document-retrieval system would be in languages that most researchers could not read; in chemistry, about 44% of the papers are in languages that many chemists in this country cannot read.[18]

KEEPING UP

The concept of keeping up in a field of knowledge needs examination. Keeping up means having all information needed for valid, optimum decisions. Keeping up means knowing what researchers think and are doing in a field, and especially to what conclusions they have come. Keeping up certainly means knowing salient conclusions and facts in a field in a way that motivates and brings appropriate action—or in a way that can bring informed action when circumstances become favorable.

Competely automated information-retrieval systems that provide the right answer rather than the right document are unavailable. We do not know how to build such a system. Computers have not been programmed to answer, without human intervention, all questions from a verbatim input of documents, abstracts, or extracts. Questions must still be answered by experts. There is not enough expert manpower available to answer all questions—especially ahead of time—and we cannot, as yet, predict all questions for which we would want to supply answers in advance.

TERSE CONCLUSIONS

Information processed through chemists emerges as conclusions. Conclusions are as important in making use of research as are the raw data. Conclusions precede action—the expected result of applied research and development. One kind of condensation is the terse conclusion,[19] a brief statement written by one versed in a field after reading a document. It is usually one concise sentence that combines wisdom of author with that of writer of the conclusion. Terse conclusions function as surrogates for documents in a different way from abstracts, extracts, reviews, reports, etc. In the first place, terse conclusion are much shorter than are the other surrogates—averaging only one hundredth the length of the document that stimulated them. About one-hundred times as many terse conclusions as documents can be read in the same time. Terse conclusions can serve as guides to documents, abstracts, extracts, reviews, reports, etc.

Some examples of terse conclusions from various subject fields are:

> Collateral veins on margins of malignant renal tumors are a firm diagnostic sign since these vessels are never associated with cysts and only rarely with benign tumors. 1.
>
> Vivactil in treating depressive disorders is similar to other tricyclic antidepressants in effectiveness and adverse reactions. 2.
>
> Factor-3-selenium (0.7 microgram of Se per 100 grams of diet) gave 50% protection against liver necrosis in rats. 3.
>
> Lecithin corrects low phosphatide-to-cholesterol ratio in bile and may prevent or dissolve gallstones. 4.
>
> Intraocular-pressure changes from sense stimulation and blinking are related to arterial-pressure rise and general arousal response. 5.
>
> Sunlight is the number one physical carcinogen. 6.
>
> KWIC indexes of verbatim titles are cheaper and prompter than other indexes but omit valid entries, scatter like subjects, provide inadequate internal and external guidance, and have unnecessary entries. 7.

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Information overload from random and nonrandom inputs is met by the adjustment processes: 1. omission, 2. error, 3. queueing, 4. filtering, 5. approximation, 6. multiple channels, and 7. escape. 8.

Serum Cu levels in lymphoma and leukemia indicate activity of the diseases. 9.

In persisting organizations, profit, growth, and productivity are never safely maximized; as "goals" they become destructive when approached, and they therefore are goals only with reference to: (a) classes of interested persons, (b) society at large, or (c) a limited time span or phase of an organization's life. 10.

Mace, of 2-chloroacetophenone, kerosine, 1,1,1-trichloroethane, and Freon, may cause skin burns around the eyes, corneal scars, and reduction in vision. 11.

A decisionmaking group acting in conditions of misinformation that require inductive problem solution and a learning group in many stable forms is a self-organizing system. 12.

The numbers following the above terse conclusions guide to references to documents stimulating production of the terse conclusions.

Second, and most important, many more terse conclusions than the longer literature forms can be carried simultaneously on the surface of the memory because terse conclusions are much shorter than are documents, abstracts, extracts, etc. This feature increases the probability that useful, new combinations of information will be found, new ideas developed, creativity stimulated, and research fostered. Terse conclusions help to integrate research results in a field in a way that reading documents or abstracts cannot do because of word dilution. A sample newsletter of Biomedical Terse Conclusions has been prepared. Reading of specific categories—e.g., "Sucrose" and "Chromium"—in the newsletter illustrates the point being made.

Third, terse conclusions are designed to function as surrogates for documents to save reading time. Leisurely reading of all pertinent documents in most fields of knowledge is an option that has long since passed.

Fourth, terse conclusions subtly include the past of a field so that there is much less necessity to read a backlog. The knowledge and experience of the writer of the terse conclusion enable him to select and word it so that it reflects this past and thus makes it less necessary for the reader to return to the past. Anthologies of selected terse conclusions can be prepared for retrospective search. Terse conclusions are not abstracts. Abstracts are reportorial; terse conclusions are evaluative and can be used as effective guides to abstracts and thus make abstracts more valuable and more used.

Fifth, terse conclusions can be uncensored and carry divergent views. Readers can keep up with progress of the differing viewpoints until resolution of the difference comes about through further research. At this time, readers will understand how the resolution came about and should accept it immediately. Thus, terse conclusions should be cogent and useful in reducing cultural lag.

Sixth, terse conclusions are easily and rapidly written. A researcher usually comes to a conclusion after reading a paper in his field. This conclusion can be written tersely in a few minutes. Both authors and researchers can be invited, without concern for imposing on them, to write their conclusions tersely as a way of sharing the time they have invested in writing and reading. Sharing of information is a normal part of the life of scientists, engineers, and researchers.

Published terse conclusions can be categorized to save users the time required to skim all of them in a publication. Many time-tested classifications are available. The *Universal Decimal Classification* is attractive in providing hierarchy as well as unique groups. Hierarchy causes, for example, a terse conclusion about sodium to fall near those about alkali metals. A given terse conclusion can be placed into all applicable categories so that each category is kept complete. This reduces scatter, saves time of readers, and prevents loss of relevant data in the event that users fail to think of all appropriate categories.

RULES FOR WRITING

Rules for writing terse conclusions are simple. Authors and others who know a field well must write them. Most terse conclusions can be written as one sentence that averages about 20 words. Specific conclusions are preferred, although valid generalizations are sought also. Evaluation is accomplished through selection rather than by critical remarks. The terse conclusion is about the paper and never about its author. Each statement is understandable by itself and independent of references. Pronouns are avoided as is citation of other work. Terse conclusions are not published as first sentences of abstracts because of reader distraction by the words of the abstract. References to terse conclusions are provided in a separate list to avoid distracting words. So much for the rules for writing and organizing terse conclusions.

COMPILATIONS OF DATA

Data are scattered throughout the technical literature. It takes too much valuable time of chemists to find, extract, reorganize, evaluate, and record data for use. Up-to-date handbooks and computer stores of all useful data are needed. The reason that comprehensive handbooks and computer stores of data have not been provided seems to be a reluctance to invest the dollars or the time of people qualified to do the job. Actually, chemists extract data all of the time. Usually results of this effort are unshared. Authors take data from their notebooks and embed them in their reports and papers for others to extract again at great pains and inconvenience. Authors of papers, reports, monographs, etc., can also submit publishable data to handbook publishers or to data-storage systems. The evaluation of the data by use of standard procedures by author, colleagues, editor, and reviewers can all help to ensure validity. It is certainly in the best interests of authors, editors, reviewers, journals, and professional societies to publish only valid data because their reputations depend on validity. We know how to publish handbooks and how to store data in computers. We know how to check and proofread data. We know how to update handbooks by use of loose leaves and how to update computer stores. We know that valuable time of chemists is wasted by their doing what handbook publishers and computer systems should be doing for them. Chemists, carried on the books at $200 per day including overhead, are too valuable to send into the wildernesses of the primary and secondary literatures searching for data that publishers and computer systems could provide in much more convenient form.

OTHER TERSE LITERATURES

Other terse literatures are possible. "Terse problems," for example, can begin the research cycle by presenting concisely what scientists are researching or developing. "Terse plans" can present ways in which problems and projects are being approached by experts. "Terse explanations" are useful in conveying rapidly how things work; they are a form of "terse results." "Terse admonitions" are useful—e.g., for a Poison-Control Center. Commands, orders, and instructions are normally terse and need little organization since they usually apply to isolated events. Aphorisms, parables, adages, maxims, epitomes, and principles are also terse literatures. Some of these kinds of terse literature have acquired, through their extraordinary success, a reputation for banality. Popular repetition has converted some statements into old saws and clichés. However, new ones can never be old and banal. Such new terse literatures deserve respect and examination for usefulness. They could aid greatly in bringing about better use of the wealth of literature we now have.

Use of terse literatures has been explored as a way of helping to lessen problems of too much to read, too many languages, and inadequate access. The author has written or edited several thousand terse conclusions. Professors of electrical engineering have successfully written terse conclusions from one page of instructions plus another page of examples. In courses in "Terse Literatures" presented by the author, professional people learn to write and organize terse conclusions for dissemination, and to prepare terse organizations of data.[20] The Missouri Regional Medical Center uses terse conclusions. Results of all of these efforts have been most encouraging. Some reservations have been expressed. "Terse Literatures are all very good and necessary—but—." One of the "but's" relates to ability to secure cooperation. From the experience in producing *Chemical Abstracts* over the past sixty-five years, cooperation in writing terse conclusions and in extracting salient data is almost certainly available gratis or for honoraria. It is to the advantage of authors to have their works widely known, used, and referenced. In fact, authors and reviewers should be enthusiastic in extracting data and in writing terse conclusions, respectively, as a way of benefitting their profession or science. Another "but" relates to financing terse literatures. Actually, the cost of producing, organizing, and disseminating terse literatures is minute when compared with the cost of experiment, reporting, and publication. Average cost of terse literatures is negligible when compared with the average value of the technical information to our civilization.

Yet another "but" relates to ability of authors and reviewers to extract salient data and write terse conclusions. These abilities have been demonstrated adequately. Electrical engineers, medical researchers, physicians, and chemists have all demonstrated their ability to write and organize terse conclusions and to extract salient data. Simple written rules are adequate. Many professional people agree that terse literatures are necessary. One operations analyst wrote, "I was most pleased and considerably enlightened by your 'terse literatures' paper.[19] Its conclusions badly need promotion in science today. Having 'like statements' brought together hierarchically augments rapid idea generation, the way I make my living; i.e., I'm trying it—it works admirably."[21]

Organizations and individuals have published terse conclusions. Dia Médico, the Argentine medical newspaper, published a column entitled, "Aforismos Cardiologios."[22] Hippocrates wrote two volumes of aphorisms,[23] actually terse conclusions, many of which are valid today; for example, "That which is used develops; that which is not used wastes away." Sir William Osler also wrote a book of aphorisms.[24] Reference works, such as "Cancer Cells" by Cowdry[25] are comprised of sentences that are mainly terse conclusions. Critical reviews are the same. The "Mini-Abstracts" of Lunin[26] are a terse literature that presents results and conclusions to function as a terse surrogate for the original document in the same way as for terse conclusions. The intent is the same as for terse conclusions.

CONCLUSION

Chemists and other professionals need added, new literatures. Chemists especially have been innovators of improved systems of communication. This tradition should be carried on. The terse literatures proposed here are not viewed as panaceas. They are pictured as further steps toward solutions to the three ever-growing problems: amount, languages, and access.

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Reading Problems in an Industrial Information Center*

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An important function of an industrial information center is to control, not multiply, the reading problem by selective use of available commercial services. When necessary, and economically feasible, specialized internal services are developed. Some of these services are described.

Gone are the days when a chemist could know by name all the people working in closely related areas of chemistry. Personal correspondence was, in the last century, a wonderful way of being aware of all advances in one's specialty. Keeping up with the literature was not overly difficult, now, however, it is impossible to be aware of all the international literature. A chemist today, especially in industry, knows only a few names of people working in his area of chemistry, he does not even know the names of all the research chemists in his own corporation. Keeping up with the literature is a major problem.

Chemistry can no longer be broken down into three simple sections, inorganic, organic, and physical; *Chemical Abstracts* now has 80 sections, and the boundaries between sections cannot be clearly defined. Should borazines be considered as inorganic or organic compounds? Should detergents, such as alkylbenzene sulfonates blended with phosphates or nitriloacetate, be classified as organic chemistry, biochemistry, or ecology?

The problem can be further magnified by the type of person requiring chemical information. Most industrial (chemical) information centers or libraries have four main types of client:

1. The corporation executive (domestic and/or international)
2. Market development and research
3. Legal counsel and patent attorney
4. The technical person—e.g., chemist, chemical engineer, physicist, mathematician, life scientist, etc.

The information needs and interests of these types of clients frequently overlap—i.e., there is no clear boundary, for both the corporation executive and legal counsel are interested in license agreements relating to the transfer of technical know-how. The patent attorney and the technical person are both concerned with technical information published in patents and in the general worldwide literature. The information center has two main categories of material for this varied audience, short-term information and literature for storage and retrieval. Short-term information can be exemplified by price quotations listed in the *Oil, Paint and Drug Reporter*, the preliminary reports on chemical imports published by the Tariff Commission, or potential 5-year-hence markets as projected by one of the economic forecasting services. Material having limited life also includes news releases relating to proposed expansions of manufacturing facilities, corporate mergers, and acquisitions. Documents suitable for storage and retrieval can be briefly described as those containing technical information of lasting value, which includes physical properties, thermodynamic data, methods of synthesis, production yields, toxicity data, etc.

Apart from information published in technical and trade journals, there are two other sources of current research material which are of utmost importance to the industrial information center. One is the ever growing number of printed patents. Although the number of U.S. patents exceeds that of any other country, foreign patents constitute the predominant part of world patent literature. Owing to differences in national patent laws, foreign patents are an important source of published information for the use of corporation executives. A U.S. patent takes approximately 2 to 3 years to issue after filing, and normally ideas are well evaluated before filing so that more than five years may lapse between the idea stage and patent protection. Many foreign countries issue patents very promptly—i.e., within six to eighteen months from date of filing. These foreign patents serve as an indicator of the research being undertaken, with a view to commercialization, by one's competitors. One commercial organization, Derwent Publications Ltd. (United

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