the 80-column IBM card. The number of possible codes is $400!/4!396! \fallingdotseq 10^9$.

A 20,000-card deck of master cards was prepared, by machine methods, from the first 5000 cards of a random-digit deck obtained from the Rand Corporation. Each Rand card contains 50 random digits. The first 48 digits were divided into four equal groups; each such group was used to produce a four-hole pattern. For this purpose the group of 12 digits was subdivided into four three-digit numbers, and each of these was interpreted as a hole. Each three-digit number not already in the range 000–399 was converted to one in that range; then the number 238, for instance, was interpreted as "punch 8 in column 23" (card column 40 was renamed 00).

To preserve the randomness, the conversion was done as follows. Initial 4, 5, 6, 7 were replaced by 0, 1, 2, 3, respectively; initial 8 by 0 or 1; initial 9 by 2 or 3. The approximately 8000 choices between 0 and 1 were made at random, by use of the 5000 random digits in column 49 of the Rand cards; the choices between 2 and 3 were made by use of column 50. The first 5000 of the 8000 choices were determined by whether a digit was in the set 0, 1, 2, 3, 4 or in the set 5, 6, 7, 8, 9. The remaining choices were determined by whether a digit was in the set 0, 1, 8, 9 or in the set 3, 4, 5, 6; digits 2 and 7 were rejected.

The abstract cards are produced as follows. A scientist reads the printed abstract and lists the attributes to be coded: for example, *solution, compressibility, sodium, chloride*. These are taken from a standard list or, when necessary, added to it. A machine operator does the rest. Each attribute on the list has a serial number, which is also punched on the corresponding master card. Master cards with the specified serial numbers are selected by machine methods. For each abstract, the codes are reproduced first from the master cards to separate detail cards, then from each detail card to the next, until finally a single card contains the superposed codes for all the attributes.

A search can be made as follows. When n attributes have been specified, the corresponding pattern of holes ($4n$ or fewer) is determined. The entire file is put through the sorter once, to select cards punched with a specified hole. The selected cards (a small fraction of the total) are put through again, to select cards punched with a second specified hole; and so on. A search can be made with a *single* pass through a more elaborate machine; but the sorter is fast and inexpensive.

To test the coding and search procedures, about 2500 abstracts, published by the American Petroleum Institute, were indexed; 377 of these were converted into abstract cards (*4*); 1700 attributes were needed. The coding and punching were done twice, independently, and the cards were compared in the reproducer. When two persons with different backgrounds (chemistry and physics) indexed independently and then compared, abstracts were converted to cards at the rate of 2.3 per man-hour. When only one person indexed, the rate was 3.0 per man-hour. One-word attributes worked well. The work of coding and punching additional attributes was outweighed by the flexibility gained in indexing; new concepts could be indexed more precisely.

Several trial searches were made with the 377 cards. No difficulties emerged, and in one search an abstract was found that had been missed in the conventional search. The file was too small to permit reliable estimation of searching time.

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4. We gratefully acknowledge the valuable assistance of Kate C. Ornsen, Margaret Johnson, and Carl W. Dempsey.

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Dangerous Dagger

Lately this laboratory received from abroad a note of commiseration on the sudden death of our distinguished director, who, happily, is much alive. Misunderstanding apparently arose from the heading of a published paper, where the author's name was followed by a dagger (†).

On the continent of Europe the dagger thus placed is almost universally understood to indicate posthumous publication. However, many American editors use it for a footnote giving the author's professional connection or other information. This happens commonly when an asterisk follows the title. Would it be too revolutionary to replace the dagger by some other symbol or a double asterisk?

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Subject Indexing in a Restricted Field

Uriel H. Schoenbach's letter on "Citation indexes for science" [*Science* **123**, 61 (1956)] contains one of the best solutions to the serious problem of assuring efficient information retrieval from the scientific literature. His suggestion that existing indexing techniques be greatly expanded in order to cover all of the significant aspects of scientific publications, instead of stressing only the "highlights," is certainly very well taken and, if implemented, would greatly facilitate the more efficient communication of data.

The Chemical-Biological Coordination Center of the National Academy of Sciences–National Research Council collects, abstracts, and codes information concerning the effects of chemical compounds upon biological systems (*1*). These data are processed, stored, and retrieved by the use of machine-sorted punch cards. Publications to be abstracted and coded are carefully examined by highly qualified scientists and subjected to the sort of detailed and discriminating indexing that Schoenbach has in mind (*2*). As a result, there may be as many as 20 separate approaches (index entries) to a particular paper (*3*).

Recently, a Cardiovascular Literature Project was set up at the CBCC, supported by research grant H-2045 of the National Heart Institute, National Institutes of Health, U.S. Public Health Service. One of the aims of this group is to collect, index, and publish all the available information in the world literature concerning the effects of chemical agents upon the cardiovascular system.

The Current List of Medical Literature of the Armed Forces Medical Library performs an excellent and indispensable service not only to the medical community but to documentation as a whole. The indexing and publication techniques employed in the present undertaking are based largely on similar methods that have been evolved and successfully used by the Current List. As a result of the restricted subject matter encompassed by the project, a much more detailed type of indexing can be employed. It is estimated that the "average" publication thus far examined by us contains about ten index entries (*4*).

All chemical compounds tested for any cardiovascular effect are separate index subject headings (generic names and *Chemical Abstracts* names are used). For biological entities, a list of specific subject headings, with ample cross-references, similar to that compiled by the Current List (*5*), but in greater detail, is used.

The published multi-indexed bibliog-