<u>'''''''Gurreni</u> commenis''

Relationship between Basic and Applied Research Illustrated by SCI ® Case Study in Anesthesiology.

September 22, 1971

For many years I have maintained that the magnitude of the journal literature problem has been grossly exaggerated. ISI has now provided considerable support for that view with its Journal Citation Index (JCITM), about which you will read more in future editorials. The JCI is the culmination of several years' research; briefly, it records the citation patterns of the world's leading scientific journals. Preliminary analysis has already resulted in formulation of the "law of concentration" (a generalization of Bradford's law of scattering1), recently reported in these pages2.

Another interesting fact clearly demonstrated by the JCI is the status of basic science journals as the core of

almost any specialty journal literature. The so-called "specialty" journals turn out to be the applied journal literature of each field. This relationship has been recently corroborated by McClelland³ in the field of anesthesia. His article in the British Journal of Anaesthesia stimulated the director of ISI's European Branch to submit an interesting letter to the same journal.4 Cawkell's letter is reproduced here as another instructive example of how the Science Citation Index® from which the Journal Citation Index is derived, can be used to map the history and growth of specialized topics.5 Perhaps the most striking aspect of Cawkell's example is the fact that not a single article of the 19 included in the "anesthesia" network appeared l in an "anesthesia" journal!

SCIENCE CITATION INDEX. EFFECTIVENESS IN LOCATING ARTICLES IN THE ANAESTHETICS FIELD: "PERTURBATION OF ION TRANSPORT"

Sir,—In McClelland's (1970) excellent article in this journal, some mention of the Science Citation Index [R] was made, with the comment that libraries are unlikely to be able to afford it.

In fact the SCI is now held by nearly sixty libraries in the U.K. Moreover, it would seem to be particularly useful to the anaesthetist, as McClelland suggests, partly because of the cross-disciplinary aspects of the subject. It has been described (Garfield, 1964; Mallin, 1968) since the article by Martin (1965) (cited by McClelland) and evaluated, often with great enthusiasm (Pings and Williams, 1970; Garfield 1970a).

The interconnections between a particular set of articles is shown in figure 1, with the associated bibliography. The network was constructed using the three elements of the Science Citation Index system, the Source Index (what has Bloggs published this year?), the Permuterm Subject Index (what articles have been published this year with these words in the title?) and the Citation Index (what current articles cite this earlier item which symbolizes my subject?).

Since the writer knows nothing whatsoever about anaesthetics, the search described in figure 1 was started by entering the 1969 Permutern Index at the word-pair ANAESTHESIA, THEORY, and the article by Seeman (Bibliography, No. 11), was found. From this one article the network was constructed by referring to the Citation Index, using a procedure described elsewhere (Cawkell, 1968; Garfield, 1969). In essence this consists of working backwards and forwards in time via citing and cited entries, with or without access to the articles themselves.

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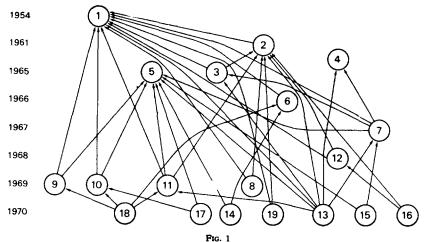
For example, the 1969 Seeman article, used as an entry point in the 1970 Citation Index (has it been cited?), led to the citing article by Halsey (No. 13). This article was obtained, and from its references, article numbers 11, 1, 5, 3, 2, 4 and 7 were noted. These were used as new Citation Index entry points (have they been cited?). The Halsey article was the only actual article seen in the course of the search.

The following points may be noted with respect to

The following points may be noted with respect to figure 1.

The accumulated article cluster is mainly related to the physico-chemical theory of anaesthesia concerned with the perturbation of ion transport.

A user who knows the subject would reject any



Citation network for articles about "Perturbation of ion transport".

irrelevant articles during the search. In this search my irrelevant articles during the search. In this search my role resembled that of a librarian—knowledgeable about the indexing system but not the subject. However, an inspection of the network reveals closely related articles. Thus, articles 13 and 7 are probably quite closely related since they both cite articles 1, 3, 4 and 5. If two articles had identical sets of references presumably they would be entirely about the same concepts (Cawkell, 1970) ("bibliographic coupling"). Evidently article number 1 has had a considerable impact (Garfield, 1970ь).

The range of cited journals in this network is interesting. Several of them do not appear in either of McClelland's lists of Anaesthetic Journals. Obviously articles about ion transport through membranes, apparently of interest to anaesthetists, are likely to appear in medical, biochemical, and multi-disciplinary journals. The SCI covers the world's prime journals of science and technology, including those listed by McClelland.

Location of articles through references coupling mitigates the word difficulty. I have been musing about the degree of interest of articles 15 and 17. As a subject non-expert, I certainly would not associate these articles with the subject in question by reading their

The bibliography is unlikely to be comprehensive. However, it represents a reasonable compromise between complete comprehensivity and searching effort. I assume that a perusal of the articles listed would provide a good overview of the subject. Any particular aspect may be pursued by using an article symbolizing that aspect as a new Citation Index entry point.

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(identity of the numbers in fig. 1)

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