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Using the *SCI*[®] to Avoid Unwitting Duplication of Research.

July 28, 1971

In 1964, I published a paper¹ in which I described an example of duplicated discovery that might have been avoided, I thought at the time, if only ISI[®] had begun publication of the *Science Citation Index*[®] early enough—with a 1958 rather than a 1961 *Annual*. In this editorial, I want to talk about that duplication of research again, not further to embarrass the authors of the work in question, but to show that I was wrong in concluding that only the hypothetical availability of a 1958 *SCI* could have prevented the duplication. I was wrong because I did not properly apply the technique of “cycling”, an important *SCI* search strategy for information retrieval. As will be shown, the 1961 *SCI*, which did indeed exist, could have been used to prevent the duplication, which occurred in 1962.

In 1962, Mazur² reported a novel method for analysis of peptides. Unknown to them, the same method had been reported by Schwartz and Pallansch in 1958.^{3,4}

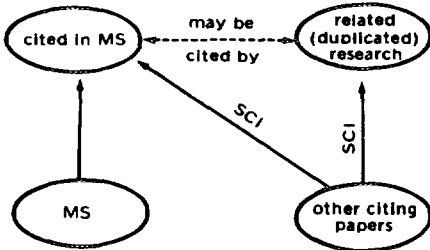
Before detailing the Mazur/Schwartz duplication, I should describe the particular application of cycling involved. To avoid unwitting duplication of research, the author of an as yet unpublished manuscript should look up

in the *SCI* each of the references he has cited in his manuscript. The most important or key paper should be checked first. The *SCI* will tell where that paper has been cited. Each citing paper thus found should be scanned. In particular, the bibliography of each paper should be examined. The examination will reveal any intervening work that is relevant to the manuscript being made ready for publication. All such papers should also be checked in the *SCI*. Indeed, the checking can be done even before these papers are obtained from the library. Cawkell has described such a procedure.⁵

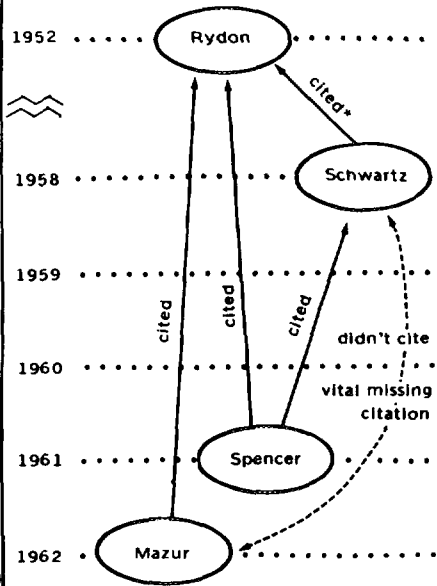
No reputable scientist wants to duplicate *unwittingly* the work of another man. There is little enough time and money to learn the endless mysteries of nature without unintentionally repeating work already done. Though the re-discovery of someone else's work can be a rewarding experience, there is initially an understandable disappointment at not having been first. (In this connection, several of my peers like to remind me that I was neither the first to think of the idea of citation indexing for literature retrieval, nor the first to apply it. Recently, I was informed

that the Institution of Electrical Engineers had a citation index which it abandoned in 1922.⁶)

In the particular Mazur/Schwartz example, the process that might have exposed the anticipatory research is as follows. One of Mazur's group should have looked up the five references he intended to cite in the paper eventually published. A key paper was Rydon's work on the ninhydrin technique.⁷ Checking the Rydon citation in the *SCI*, he would have found it to be cited by about 20 papers, all of which appeared in readily available journals. A cursory examination of these papers would have revealed the one by Spencer⁸ which referred to the work of Schwartz et al., who had reported four years previously the method described as novel in the manuscript then being readied for publication. This cycling process is illustrated in the following diagram.



Finally, since I have done considerable research on this particular example, an abbreviated network diagram for the particular example discussed here is shown below.



*A hypothetical 1958 *SCI* would have revealed this link, but the existing 1961 *SCI*, through cycling, could have revealed the Rydon/Spencer/Schwartz connectivity.

1. Garfield, E. *Science Citation Index*, a new dimension in indexing. *Science* 144(3619): 649-654, 1964.
2. Mazur, R.H. et al. A new reagent for detection of peptides, nucleotides and other N-H-containing compounds on paper chromatograms. *J. Biol. Chem.* 237:1619, 1962.
3. Schwartz, D.P. & Pallansch, M.J. Tertbutyl hypochlorite for detection of nitrogenous compounds on chromatograms. *Anal. Chem.* 30:219, 1958.
4. Correction note, *J. Biol. Chem.* 237:3315, 1962.
5. Cawkell, A.E. Search strategies using the *Science Citation Index*. In *Computer Based Information Retrieval Systems*, B. Houghton, ed. (London, Clive Bingley Ltd., 1968). Reprinted in *Current Contents/Life Sciences* 12(44):89-103, 1969.
6. Cleverdon, C.W. Personal communication, 1970.

7. Rydon, H.N. & Smith, P.W.G. A new method for detection of peptides and similar compounds on paper chromatograms. *Nature* 169:922-923, 1952.
8. Spencer, N. Paper chromatographic and electrophoretic separation and identification of some naturally occurring tetronic acids. *J. Chromatography* 6:498-504, 1961.