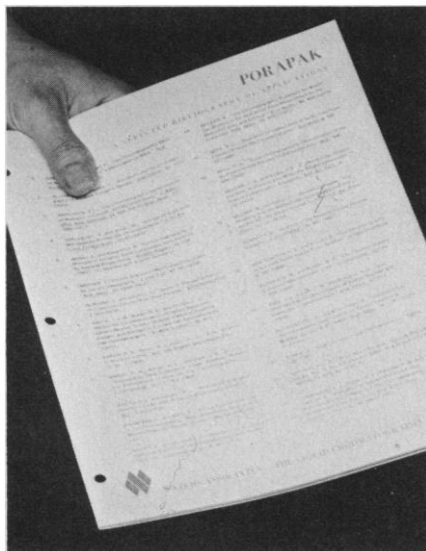


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## Citation Analysis

The article by Nicholas Wade on citation analysis (*News and Comment*, 2 May, p. 429) omits two pertinent considerations. First, critical examination of citations in a special field usually reveals that citation errors and omissions in the bibliography of one author are transferred literally to another. This appears to imply that work which is not cited in an early well-known paper has a low probability of appearing as a historical reference in later papers. More important, there is ample historical evidence that many fundamental papers "ahead of their time" are ignored for lengthy periods before their importance is realized or their results rediscovered. The proponents of citation analysis as a tool for the evaluation of individual merit are thus adding injury to insult in these cases. The overall effect would be to discourage work which runs counter to the prevailing streams of thought.

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Suppose the "interesting possibilities" of the citation index come to pass. To keep a place in the scientific world it would be wise to, at the very least, make sure you are always first author of any article; cite yourself as often as possible; insist that your work be cited in all articles that you review; and automatically pass articles that already contain a sufficient number of citations to you. Unfortunately, you will not get any credit if an author leaves out one of your initials or, even worse, misspells your name. Nevertheless, if the above steps are taken, you should be able to push your "lifetime citation rate" over those of any immediate rivals. If all else fails, publish a paper containing a subtle misuse of the second law of thermodynamics.

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Whatever the purported benefits of citation analysis, I am sure that it will have as many, and maybe more, drawbacks. I can think of several problems without any difficulty.

I question whether citation analysis will "clearly" describe "something real about the scientific world" as Wade suggests. Figure 1 in Wade's article points to the fact that the two most-cited authors in 1967 have not been awarded the Nobel Prize. Nor have those ranking fourth and seventh through thirteenth.

Another problem is that papers which describe techniques are often cited with greater frequency than those in which a major breakthrough is reported. This despite the fact that many administrators do not consider technique papers to be as important as those reporting breakthroughs.

The most important drawback is that papers, even very significant ones, in smaller research areas will not be cited as often as less important articles in more popular fields. Needless to say, the popularity of a field has nothing to do with its scientific importance.

Finally, consider a paper that is criticized widely for being simply bad. It will be cited often, but citation analysis will not indicate that these citations were for the purpose of criticizing it.

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As Wade points out, citation analysis "seems likely at present showing to corroborate the decisions made by the embattled peer review system." Of course, some of the "references are simply the 'noise' in the system, which [citation analysts] believe they can, for many purposes, filter out or at least reduce to insignificance." One way of performing the filtering or reduction is to bypass the citation counts and go directly to the main factor—money. The fellow who is able to get the grants and contracts is the fellow who gets the doctoral students. Each student publishes two or three papers on his thesis, in each of which he cites his professor's work. Then he goes on and does his own subsequent work, in which, of course, he cites those thesis papers which were coauthored by his professor, as well as the previous work. The grantee also goes (or sends his troops) to meetings where his work can be publicized; he pays page charges; he orders large quantities of reprints and mails them out broadside to everyone active in the field. The ultimate scientist spends all of his time in Washington, has no time at all for research, and is cited continually for work which he signed.

Therefore, instead of counting the number of citations, we should count the number of dollars. This would have the great advantage of completely corroborating the system. The granting agencies would then be able to prove conclusively that the people to whom they are giving the money are indeed the finest scientists.

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