

And Who Shall Occupy the
250th Chair among the
Citation Immortals?

Number 22

May 31, 1976

In the near future we plan to publish a list of 250 highly cited scientists. Why the magic number 250? It turns out that just 254 scientists were cited 4000 times during the fifteen-year period covered by the *Science Citation Index*[®]. I suspect that a few days after we publish this list someone will protest our failure to include author number 251. This is indeed a dilemma of classic proportions.

I recently mentioned my dilemma to Professor Harriet Zuckerman, the Columbus University sociologist. Zuckerman has devoted a significant part of her career to the study of 'scientific elites'. Such indeed is the title of her forthcoming book.¹ She reminded me that the problem is the same as that of the 41st chair of the French Academy of Sciences. Membership in that particular elite is limited to 40. Only the death of a member vacates a chair for election of a new member. Who sits waiting in the '41st chair' to join the Immortals has always provided the French with lively discussion over the afternoon aperitif or after-dinner brandy. To be regarded as a deserving occupant is a matter of some distinction.

I'm grateful to Professor Zuckerman for telling me about that 41st chair. Since she did, I've learned the expression has come to be used elsewhere in connection with extremely competitive selections. A young friend has told me

it is now almost the expected apology to unsuccessful candidates for United States medical schools. Someone has to sit in the 41st chairs. I suppose that many of us often ask, in a variety of situations, why does it always seem to be me?

My talk with Professor Zuckerman did suggest a potential solution to my dilemma. Listing only 250 of the two thousand most cited scientists, I run the risk of becoming the most discordant if not the most hated editor of all time. Not all Nobel laureates are to be found among the 250 most cited authors. But 99% of them will be found among the two thousand most cited scientists. I intend to publish that list one day in an *ISI Atlas of Science*. But if I serve up only the top 250, I must inevitably offend a very large number of distinguished persons. Probably more outraged will be an even larger number of their students, friends, national partisans, and professional colleagues. Maybe this will cause some of them to ask a pertinent question: Why is it that Nobel prize winners seem to be excluded from further formal recognition while others pick up lesser awards almost yearly?

To prepare my list of 250 scientists, might it not be more democratic, and perhaps more discrete, to make a random choice from among the two thousand most cited authors? In this way the

rightful occupant of the 251st chair would never know for certain that he had been slighted. Furthermore, many more people than the rightful occupant could feel themselves equally entitled to it.

When I publish the list of 250, I will not include the 250th name. Its absence will point up my discretion and sensitivity. It will show clearly that I have no personal animosity against any of the 1751 other candidates who might have been chosen. If I repeat the random selection each year for ten years, almost all deserving authors should eventually appear among my lists of citation immortals. Perhaps some doctoral candidate can calculate the probability that some deserving scientist will be missed. Although we began studying the characteristics of highly cited authors over fifteen years ago,² we didn't publish a list of such names until 1970.³ Looking at the old list, based on 1967 data, I find that only a few of the recent Nobel laureates were then being cited frequently enough to have been included in the top 250. Back in 1967, for example, there were only 351 citations to the work of Baltimore and only 286 to the work of Temin. (Those counts do include any citations to other papers of which they were given as secondary authors). However, by the end of 1975 their cumulative citation counts were 1694 and 1849 respectively. It was precisely this rate of growth prior to the

Nobel prize which we had reported as being significant.²

Citation analysis enables us to keep up with the rapidly changing scene in science. It's not infallible, but it has alerted us at ISI® to new and emerging topics of scientific research, and to the people doing significant work on those topics. Undoubtedly we have made some careers a bit more illustrious than they might otherwise have been had we not identified and publicized their citation impact.

On the other hand, some scientists of acknowledged stature have unimpressive citation records. If peer review indicates that they have made significant contributions, I would not usually quarrel with that determination. Yet it should be instructive to study the peculiarities of research topics in which significant publications remain relatively uncited. Will we find that such exceptions are due to the obliteration phenomenon I've mentioned before?⁴ Incidentally, I recommend that every aspiring scientist read Merton on the subject of obliteration,⁵ and other aspects of scientific behavior before undertaking graduate study.⁶

Alternatively, we may find that certain types of significant contributions to science do not elicit citations as one expects and observes in most cases because the work falls into the category of 'premature discovery'.

1. Zuckerman H. *Scientific elite: Nobel laureates in the United States*. New York: Free Press Macmillan, in press.
2. Sher I H & Garfield E. New tools for improving and evaluating the effectiveness of research. In: Yovits M C et al. eds. *Research program effectiveness; proceedings of the conference sponsored by the Office of Naval Research, Washington D.C., 27-29, July 1965* (New York: Gordon & Breach, 1966), p. 135-46.
3. Garfield E. Citation indexing for studying science. *Nature* 227: 669-71, 1970.
4. ———. The obliteration phenomenon in science—and the advantage of being obliterated! *Current Contents*® (CC ®) No. 51/52, 22 December 1975, p. 5-7.
5. Merton R K. *On the shoulders of giants; a Shandean postscript*. (New York: Harcourt Brace & World, 1965), p. 218-19.
6. ———. *The sociology of science: theoretical and empirical investigations*. ed. & introd. by N.W. Storer. (Chicago & London: Univ. of Chicago Press, 1973), p. 123, 325-42.