

## In this issue

### Fifty years of citation indexing

We celebrate in this issue the fiftieth anniversary of a paper published by Gene Garfield. What is so great about that paper in *Science* 1955? In some ways, that paper sketched the conceptual foundations of scientometrics, which was later enriched by Garfield, Derek de Solla Price, Joshua Lederberg and Robert Merton. More importantly, it led to wholly new ways of searching the literature and understanding the structure of scientific knowledge. Says Joshua Lederberg, in the Preface he wrote for *Genetics Citation Index* in 1963, and which we have reproduced in this issue (**page 1502**): 'I had no idea how to look up the literature in the documentation field and from past experience with subject indexing in science had little confidence in the utility of a literature search'. Lederberg found the perfect solution to his problem in citation indexing. 'It was parallel to many others in my own research activity. How often I have run across some older reports on methods or on some curiosities of bacterial variations and been frustrated in attempts to find later work on the same subject and, especially, critical enlargement on the earlier work.' It was fitting that Garfield chose a geneticist to introduce his revolutionary database, as geneticists are concerned with parent-offspring relationships that make it easy for them to understand 'the structure of scientific activity that is inherent in citational references'.

In a rather short paper, Olle Persson (**page 1503**), the jovial Swedish sociologist, applies the very technique

developed by Garfield to trace the citation history of Garfield's seminal paper. Blaise Cronin (**page 1505**), who entered the field two decades ago with a cute little book on the citation process, answers the microsociologists and others who doubt the validity, legitimacy and utility of citation analysis, in his own characteristic style, 'A hundred million acts of whimsy? I trust not'. Citations are not dispensed randomly, and the scholarly publishing ecosystem ensures that scientists typically cite the works of their peers in a normatively guided manner and that citations perform a mutually intelligible communicative function. Loet Leydesdorff (**page 1510**) traces the history of evaluation of science, starting from the Second World War when the military impact of science and technology came to the fore, and the evolution of science indicators, in which citation index has played an important part. He ends his essay thoughtfully locating science and technology indicators in their economic and political contexts. Grant Lewison (**page 1524**) explores new ways to evaluate research. He emphasizes the need to go beyond citations by researchers only, as the impact of science goes far beyond. He pleads for setting up national evaluation units both to generate appropriate new methodology and to produce new indicators.

Andrea Scharnhorst and Mike Thelwall (**page 1518**) explore how visualization and hyperlink networks can complement citation analysis and give different perspectives on science as a social system. It is important, they say to take citation theories into ac-

count in the verification of network models and the interpretation of indicators based on them. Prabir Dastidar and Olle Persson (**page 1552**) have used data on cross-national exchange of citations to map the global structure of Antarctic research.

The last few years have seen the emergence of databases other than *Science Citation Index* that can be used for collecting citation data. Dana Roth (**page 1531**) examines some of the competitors to *SCI*. Peter Jacso (**page 1537**) makes a detailed comparison of *Web of Science* (the web version of Garfield's citation index), *Scopus* and *Google Scholar*, and finds *WoS* to be the best of the three in many respects. But as competition picks up, none of them can be complacent, and no doubt the users will benefit. Tibor Braun and Ildikó Dióspatonyi (**page 1548**) look at the participation of scientists from different countries in the gatekeeping function – acting as editors and editorial board members of key journals. As expected the USA stands first in the number of gatekeepers, number of papers published and number of citations won. India is 21st in the number of gatekeepers, 20th in the number of papers published and 21st in the number of citations. We have a long way to go!

Gene Garfield turned 80 a few weeks ago. While offering these essays to him and wishing many more years of health and happiness, we wish to tell him that we are looking forward to many more stimulating ideas from him that would transform the way people do things, as the citation index did.

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