

Mercè Piqueras

Blaise Cronin, Helen B. Atkins (eds): *The web of knowledge: a Festschrift in honor of Eugene Garfield*

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Festschrift is a German word that English has adopted to name a usually miscellaneous volume of writings from several authors for a celebration, especially learned essays contributed by students, colleagues and admirers to honor a scholar on a special anniversary. Eugene Garfield turned 75 in September 2000, and his colleagues – most of them his disciples, and surely his admirers too – decided to honor him with this writing of celebration – this Festschrift (Fig. 1). As B. Cronin and H. B. Atkins state in the Introduction, Eugene Garfield is, for many people, “synonymous with citation indexing.” Indexing scientific literature was the invention of the young chemist Garfield in the 1950s. In fact, the roots of both information science and scientometrics are to be found in the seminal article Garfield published in *Science* in 1955, which Joshua Lederberg reproduces in his contribution to the Festschrift [Garfield E (1955) Citation indexes for science. A new dimension in documentation through association of ideas. *Science* 122:108–111].

The web of knowledge is much more than a mere Festschrift to honor Garfield. I dare say that in the future it will rank high in the citation indices of bibliometrics and publication literature. A total of 26 chapters cover all aspects of information science and are grouped in five main sections. The Preface and the Introduction by the editors tell the reader the genesis of the book and are useful for those not acquainted with Garfield’s work to locate him in the field of information science. Many scientists – especially young scientists – have learnt about the Impact Factor (IF) and the Science Citation Index (SCI) from the beginning of their careers as researchers, or even before, as undergraduate students. In fact, what was meant to measure scientific productivity of research centers and universities has become, erroneously, a criterion to assess individual research.

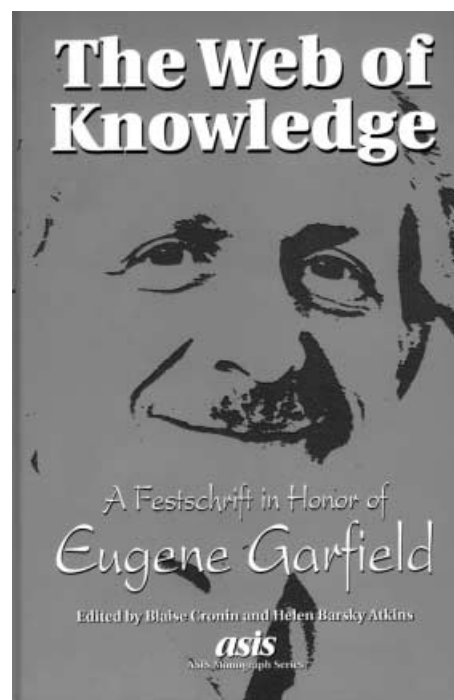


Fig. 1 Blaise Cronin, Helen B. Atkins (eds): *The web of knowledge: a Festschrift in honor of Eugene Garfield*

Many of those who are so concerned about the IF when choosing a journal to which to submit their manuscripts may not know, however, that IF and SCI are relatively new concepts. Among not-so-young scientists, who may have become acquainted with IF and SCI some decades ago, many do not know exactly how they work, not to mention when they originated.

If the roots of modern information science are in Garfield’s 1955 article, the seed is to be found much earlier: in the high-school student that became acquainted with the printing process and technology in summer school; in the young researcher that first discovered the extensive library on chemical literature at

Columbia University (where he had been struggling, not very successfully, with experimental work in the laboratory) and then encountered the Division of Chemical Literature of the American Chemical Society (ACS). There, Garfield got to know James Parry and his work on the application of punched-card technologies to the management and manipulation of chemical literature knowledge and information. Soon afterwards, Garfield left the lab bench for the libraries' shelves and computers. From the "Historical perspectives" section, we can trace the path he followed to become the leader in information science, and we can also learn how to assess the current value of a company – the Institute of Scientific Information (ISI), which Garfield set up in 1958 by borrowing \$500 from Household Finance – whose capital resource is mainly a database.

One of the contributors, Joshua Lederberg, is well known by microbiologists. In 1946, together with Edward L. Tatum, he described bacterial genetic recombination (conjugation) in *Escherichia coli* K-12; in 1952, with Norton D. Zinder, he described the transfer of genetic material between two strains carried by a phage (transduction); he also introduced the technique of replica plating to isolate mutants from a population of microorganisms grown under non-selective conditions. In 1958, he was awarded the Nobel Prize for Physiology or Medicine, which he shared with Tatum and Georges W. Beadle. In 1959, he and Garfield established a long-lasting relationship that turned out to be very fruitful for both of them. The letters he and Garfield exchanged during 1959, reproduced in the Festschrift, tell the reader how that relationship started. In "The scientific literature," we find a historical perspective of the growth of scientific literature, which has not been uniform in all fields; smaller sub-divisions tend to undergo proportionally larger and more rapid fluctuations in growth rate. Other topics discussed in this section include the features of journal literature, the role of journals to promote scientific knowledge, and the utility of using diagrams, graphics, networks, matrices and multidimensional scaling procedures to convey information.

"International issues" deals with international collaboration in research, which has become a more and more frequent practice in some areas, and includes

articles that assess the impact of scientific information in several regions including Latin America, China, and India. "Evaluative bibliometrics" is the longest section; it comprises eight chapters focusing mainly on citation measurements and their application to assess research in different fields. The use of bibliometrics for that purpose – at least to measure the quality of individual research – has been criticized. IFs can be inflated by aspects such as the difficulty in comparing citations across different research fields; the size of research fields; the fraction of total journals in a given field included in the ISI database; the inclusion of editorials, letters and meeting abstracts in the calculation; the abuse of self-citations; and the inclusion of review articles and also long articles [Segle PO (1997) Citations and journal impact factors: questionable indicators of research quality. *Allergy* 52:1050–1056]. Nevertheless, the book conveys the impression that the IF is a more objective approach than traditional peer review. The last section, "Social network analysis," enlarges the topic of the title. As Henry Small states in his contribution: "SCI has made it possible to study the global communication network of science, including the critical linkages between disciplines." Citation indexes are not only most valuable tools to recover information, but also data sources for research in the sociology and the history of science; reference networks can provide a lot of information on scholarly development. All articles contain notes and references that serve as sources of information for those wishing to know more on the topic; an excellent index allows specific topics to be located within the book.

As a complement to his Festschrift, I recommend a visit to Eugene Garfield's website (<http://www.garfield.library.upenn.edu/>). Besides Garfield's biography, the visitor will find a wealth of information on information science, and many of Garfield's articles: all his "Current Comments" – short sensible articles published in *Current Contents* from 1962 to 1995 – , commentaries on citation indexing published in *The Scientist*, and other essays. *The web of knowledge* is a book recommended to librarians, documentalists and other specialists in information science. In addition, it may also be of great interest to people involved in evaluation of science, and to researchers wishing to know more about the means used to evaluate their work.