

## Foreword

A tradition has emerged by which the writers of the Forewords of *Essays of an Information Scientist* must tell how they first met the author, Dr. Eugene Garfield. However perverse as it may seem, I would rather begin by referring to a moment during my most recent meeting with Garfield, just a few days ago.

I found he was passing through town, and he agreed to have lunch with me. I always look forward to such an occasion, which gives me at least a brief glimpse into the workshop of his mind. But this time there was a special celebratory air about him. He handed me a chocolate cigar to signal the birth of the latest addition to the Garfield family, Alexander Merton Garfield. He seemed the typical proud father; but it came to mind that his pleasure in a new son was also connected with his most abstract interest in children and childcare that I had noticed in many of his published essays, as well as in his dedication of Volume 5: "To all my children—past, present, and future."

In other regimes this successful joining of theory and praxis might give rise to ideological discussion; I prefer to put it forward as a metaphor—a metaphor for Garfield's part in the conception, nurturing, and efflorescence of Information Science since he started the Institute for Scientific Information, just 30 years ago.

With a little prodding from my side, he goes on to speak of the other "children" he expects to emerge soon: an index to 19th century science, including implicit citations (often included now in the Arts and Humanities *Citation Index*); an annual Atlas Encyclopedia of Science; a Newspaper of Science, first bi-weekly and then perhaps weekly; and other explorations, taking full advantage of the new technologies of computers and image-bearing disks.

I try to imagine how these new means will amplify the long list of research aids with which ISI has penetrated the working lives of the research community. Metaphors continue to present themselves. Who is this man with whom I am having a pleasant lunch? A Lazare Carnot, organizing the information revolution? A Diderot, encyclopedizing the findings of all the sciences, arts, and humanities?

There is much in both of these analogies, yet something essential is lacking. Garfield has not merely marshalled large pre-existing sets of forces, and has not only made a net with which to dredge the flood of information to find items which are wanted but disconnected from one another. He and his collaborators working with him in Philadelphia evidently have had to go much further, creating the ideas, methods, and actual material tools with which one can make meaningful connections between the atomized fragments of information that are washing over all of us, a torrent out of control.

The mere statistics of the flow of information through Garfield's hands—each a device for making the myriad of atoms individually accessible—are indeed awesome: Each month ANSA updates chemists on about 16,000 new compounds; the Arts and Humanities *Citation Index* annually covers literature in over 6,300 journals; every week the Automatic Subject Citation Alert sends out items culled from nearly 5,800 journals; the *Address Directory* formerly the *Current Bibliographic Directory of the Arts & Sciences* gives names, addresses, and descriptions of the output of nearly a million authors worldwide, every year; *Current Contents* is read by more than 350,000 persons weekly; the Index to Scientific & Technical Proceedings alerts the researcher to some 100,000 such conference papers published each year; the *Science Citation Index* keeps its eye on 3500 journals and indexes nearly nine million citations in 600,000 items yearly; and on and on. Or think of the extraordinary diversity of topics covered, week after week, in Garfield's lead essays in *Current Contents*, collected over the years in these volumes—essays on Nobel Prizes, agoraphobia, cystitis, entomology, gerontology, children's books, fine arts. . . .

In the history of science there have been persons who have loved an immense mass of detail for its own sake. Many of the 19th-century spectroscopists provide examples, such as Kaiser and his monumental volumes of data, wavelength by wavelength, obtained under every conceivable condition of pressure and potential difference. Garfield

cannot be explained this way, of course. The fruitful analogy is not Kaiser, any more than it was Carnot or Diderot. Rather, the motivating force seems to me similar to that of an earlier figure, one who found himself at a similar point in the development of his field, when a few orderly and powerful regularities about the dynamics of the solar system were struggling to emerge out of the over-abundance of informational detail of the most diverse sort.

One need glance only at a few pages of Johannes Kepler's works to realize that the three laws that textbooks now selectively remember him for (and which he never so labelled) were quite hidden from the eye of the casual reader under all that diversity. They were obscure even to Galileo, who could not bear the seemingly scattered nature of Kepler's preoccupations. And to be sure, in terms of the range of what caught his attention, Kepler was generally thought to be too omnivorous even in as mature a work as his *Epitome of Copernican Astronomy*. There he gives us, side by side with details of planetary positions and orderly motions, his disquisitions on Aristotle, on the Scriptures, on the geometry of the primary and secondary figures, on the hierarchy of densities and rarities, on the sounds the monochord plays in the minor and major modes, on soap bubbles, on magnets, on the question whether intelligences can act as motor forces, on light as *lux* and *lumen*, on pedagogy, and on the wars in Austria. It was all part of his "celestial physics"—and the apparent chaos of minutiae is put to work in the service of a vision of simplicity and order that became evident to others only later.

Indeed, one of the characteristics marking the founders of any science is that their imagination should be able to embrace both the antitheticals, using the wealth of inchoate detail as raw material for the recognition of meaningful patterns. It must be so also among the founders of Information Science. Thus Garfield and his collaborators are showing us the patterns of evolution in the growth of sciences which are emerging from their layered "maps of science" and matrices of cluster co-citations.

As the field develops further, one can count on the continued prominence of Garfield's work in his pursuit of the Keplerian quest. There is also much benefit in the happy accident that in him are combined both productive scholar and industrial entrepreneur. It is a joining that can continue to bring into practice rather quickly ideas that

otherwise might grow and become applicable much more slowly. In sum, all of us who are concerned with the social study of science will be keeping a keen eye on Philadelphia for many more stimulating volumes of the *Essays of an Information Scientist*, and on Garfield's many children, past, present, and future.

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