

In this issue

A tribute to Gene Garfield, the quintessential gatekeeper

Philadelphia is known for pretzels, its philharmonic orchestra, the Independence Hall and of course Gene Garfield and ISI. It is fitting that, when his fledgling outfit grew too big for the Chicken Coop in New Jersey where it all started, Gene chose the city where the founding fathers of a nascent nation created much of the nation's early history to create his own epoch-making innovations, which will make the stuff of history of science and scholarship of our times. It is there, from his third-floor office in the elegant ISI building in Market Street, that he built an intellectual edifice, which at once encompasses both the cognitive and the social networks of the knowledge enterprise we call science. It is there he received and discussed with countless number of scientists and scholars from far and near, rich and poor, Nobel Laureates, Fellows of leading academies of science and budding young scientists struggling to get a foothold. It is there, on my first visit, Gene introduced me to Derek de Solla Price and Robert Merton and later Vasily Nalimov among several other intellectual giants. He also travels widely and has friends virtually in every country in the world.

When I was a student at the Indian Institute of Science in the early 1970s, every Friday evening, when new arrivals were displayed in the current periodicals hall of the library, I had seen a mini queue of students and faculty waiting for their turn to have a look at the latest issue of *Current Contents*. And many of those readers, including yours truly, would first turn to 'Current Comments', Gene's weekly essays. Imagine how happy I would have been when, years later, Gene gifted me a whole set of those essays, reprinted in 15 volumes wrapped in bright orange (his favourite colour) dust jackets.

It was in 1973 that I wrote to him first, in my capacity as the executive editor of the Indian Academy of Sciences' new journal *Pramana*, on

why the journal should be indexed from its very first issue in *Current Contents*. Pat came his reply with probing questions. The next year, when Gene came to Mumbai to speak at the FID Congress, we invited him to spend a few days in Bangalore as the guest of the Indian Academy of Sciences. I was the Secretary of the Academy then, apart from being the editor of the Academy's publications. In the next few days I spent with him, I was amazed at his energy, breadth and depth of knowledge, razor sharp intelligence, fertile mind, and insights into problems and his plans for solving them. Thus began an enduring friendship. He is a true polymath. Look at the range of topics on which he writes with such erudition and felicity. Among the Indians for whom he has great regard are cholera researcher Sambhu Nath De, who remained unrecognized and unsung in his own country, and librarian S. R. Ranganathan, both of whom he thought were of the Nobel class.

In some ways, Gene resembles Melville's Captain Ahab chasing relentlessly Moby Dick, the white whale, against great odds. There were times, I am told, when *Science Citation Index* was wiping out all the money brought in by *Current Contents* and senior colleagues at ISI advised Gene to abandon it. He would not. He persisted with it and today the Web of Science – the Web version of the citation index databases of ISI – commands a very large clientele, especially in the West. He intuitively knew that it was not only a great and elegant idea but also a winning idea. Today organizations such as the National Science Foundation and the Directorate General XII of the European Union use citation data routinely.

At 75, Gene continues to be as mentally agile, creative and curious as ever. Every time I meet him, I feel recharged. As Stevan Harnad points out in his article in this issue, Gene's ideas and efforts were before their time. Undoubtedly. After he sold ISI, he spends much of his time and energy in building *The Scientist* – the

newspaper for scientists, especially biologists, which he founded more than a decade ago, and which he has made available, as he has done with his Essays, on the Web for anyone anywhere to read.

For this special section honouring a man who has probably contributed more than anyone else to the tremendous transformations that have taken place in the second half of the 20th century in the way we access and make use of information in the knowledge enterprise, I invited contributions from three social scientists – Alan Hedley, Stevan Harnad, and Olle Persson – and a scientometricist, Peter Vinkler. Olle, the jovial Swede, has written (page 590) a short but sweet account of the intellectual base of Gene's discipline, viz. scientometrics. Based on author cocitation analysis, Olle's paper reveals the central role played by Derek de Solla Price and Gene Garfield in the evolution and development of scientometrics in the past more than two decades. Alan Hedley, the Canadian scholar interested in the role of information and communication technologies in development, is greatly concerned about the homogenization and (mindless) Westernization that are taking place. Employing a systems theory perspective, he provides evidence (page 592) of convergence in natural systems (ecosystems, species and organisms), social systems (cultures and languages), and technical systems (infrastructures and patterns of human settlement) as a direct result of human intervention. Rather than producing beneficial effects, these convergences are having severely deleterious, even species-threatening results. He pleads for variety and concludes that diversity, not convergence, is a major key to our continuing evolution on earth.

Harnad and Carr have written (page 629) on a topic of great current interest and much relevance to scientists and scholars everywhere. Their paper on e-print archives and open citation linking is at the very cutting edge of developments in scholarly publishing and information exchange and has all the makings of a citation

classic. This and the paper by Peter Vinkler (page 602) – on how to use publication and citation data for the evaluation of performance of academic researchers – are of immediate relevance to scientists in India. Peter describes how special scientometric indicators have been used for evaluating publication activity of research teams for about 30 years in the Chemical Research Center of the Hungarian Academy of Sciences. The Hungarian approach appears to be better than the one followed by some of India's apex bodies.

We have also taken this opportunity to introduce two newcomers to scientometrics from our small group at the M.S. Swaminathan Research Foundation. B. Jayashree, a cancer biologist, has looked at fish and aquatic research (page 613) in India, based on data collected from half a dozen databases and comes up with some revealing conclusions. It was T. J. Pandian, a member of the editorial board of *Current Science*, who wanted us to look into this area. Jinandra Doss has examined (page 621) international collaboration in science in Asia. Most studies on collaboration concern advanced countries. In the recent past, however, the per cent of papers resulting from international collaboration involving Asian countries is increasing fast. Of late, China has not only overtaken India in the number of papers published, but is also sought

after more often than India by advanced countries for collaborative research.

I hope readers of *Current Science*, and Gene Garfield in particular, like the offerings.

Subbiah Arunachalam

Passive locomotion

Human gait and animal locomotion are objects of natural curiosity to a lot of people in the mechanics community. However, perception of the overwhelming muscular and neural controls involved in these motions discouraged analysis of the same for a long time. The robotics community has made sustained efforts in making controlled machines that mimic human gait and some forms of animal locomotion. Needless to say that the questions of stability of motion in these machines have always been looked at from the controls point of view. However, reports of much lower levels of neuro-muscular controls in simple human gait have appeared in the recent past, which suggest that a large part of the walking motion could be simply passive. Analysis of passive walking is fairly recent. In fact, passive locomotion caught the imagination of the analysis people only after Ted McGeer built

a passive walker around 1990 and showed that his two-legged walker could produce stable gait without any controls. Since then there has been considerable interest in understanding and analysing passive locomotion.

Most forms of animal locomotion (including human gait) involve some sort of collision with the ground. The collision, in turn, provides a mechanism for energy dissipation. Therefore, theoretically, no passive locomotion can be sustained over a long period that involves collisions with the ground. McGeer's walker is driven by gravity (it walks on a gentle slope). The questions of stability of motion, then, are related to the energetics of the impacting motions. Unfortunately, impacts introduce nonlinearities that render the underlying dynamical system non smooth, and hence the stability analysis becomes somewhat involved. The paper on the passive hopper by Reddy and Pratap (page 639) shows an ingenious solution that makes a spring-mass hopper hop forever despite inelastic collisions with the ground! The authors find sets of initial conditions that render the collisions dissipationless and show that the ensuing incessant motions are one-way stable. This is indeed a very promising result and is likely to get the attention of the mechanics community that thinks about these issues seriously.

V. H. Arakeri