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## EDITORIAL

### The mores of publishing in science

**Mores:** *Folkways of central importance embodying the fundamental moral values of a group.*

– *The Random House Dictionary*

**Mores:** *Customs or conventions regarded as essential to or characteristic of a community.*

– *Oxford English Dictionary.*

Scientists function as a tribe. In the modern world, the mores of science transcend national boundaries and the barriers of culture and language. Journals and publications bind peer groups in diverse disciplines. Thousands of scholarly papers are written, refereed, edited and published every year; an exercise which involves the voluntary and enthusiastic participation of members of a far flung community, held together by tribal bonds, which few outsiders can completely comprehend. Scientists love to see their names in print; authoring a publication is akin to a rite of initiation.

‘His name is Greek, his nationality is French and his history is curious. He is one of the most influential mathematicians of the 20th century. The legends about him are many, and they are growing day by day.’ This description of *Nicolas Bourbaki*, a ‘collective pseudonym used by an informal corporation of mathematicians’, who set out to write a comprehensive treatise on mathematics appeared over 45 years ago when the Bourbaki legend began to grow (Halmos, P. R., *Sci. Am.*, May 1957, pp. 77–81). Here was a group of influential and enormously accomplished mathematicians publishing their scholarly work under a pseudonym derived from the name of a none too distinguished general, who played a minor role in the Franco-Prussian War, in the second half of the 19th century. Publishing under a pseudonym is not widely practiced in science, where authors clearly like to be identified and counted. It is, of course, a more common practice in literature; in English, Lewis Carroll (Charles Dodgson, a mathematician) of *Alice in Wonderland* fame and George Eliot (Mary Anne Evans), among whose works *Silas Marner* is probably widely known, consistently used a ‘pen name’. The use of pseudonyms is common among authors writing in Indian languages. But, pseudonyms are an exception in the world of science, although Halmos in his article draws attention to the 1 April 1948 article

in *The Physical Review*, which appeared under the byline of Alpher, Bethe and Gamow. The fictitious ‘first author’ was invented by his famous co-authors. Not too long ago, Carl Djerassi used pseudonymous authorship, as a tool to highlight in fiction the passions and jealousies that accompany the publication of path-breaking scientific work, accomplished by scientists working as a group (*The Bourbaki Gambit*, Carl Djerassi, Viking Penguin, 1996).

The authorship of publications has become of paramount importance in the life of modern, practising scientists. With the exception of scientists who work in industry or in government directed strategic projects, publications are the sole means of garnering peer recognition. Scientists have devised elaborate methods for ranking journals and the pernicious practice of quantitative assessments of publication lists have become commonplace; in India the disease of averaging journal impact factors has spread like a cancer. In every assessment committee publication lists of prospective candidates are carefully scanned; journals sifted according to their perceived ranking and in the case of multiple authors, personal prejudice and the position of the author’s name on a long list are used to apportion credit. The ‘first author’ is often deemed to have been mainly responsible for the published work, while the ‘corresponding author’ whose name sometimes is placed at the end, like the anchor in a tug-of-war, is presumed to be the guiding force in the published research. As multi-author papers are the norm in the literature of modern science, the task of assigning credit (and at times, responsibility) has become increasingly difficult.

A new practice has sprung up. Author bylines sometimes carry a footnote which states: ‘The first two (or on occasion, three) authors contributed equally to this work’. Symbols that appear as superscripts allow members of a group to stake a special, quantitative claim for their contribution to a collective enterprise. The best of journals have succumbed to pressure from authors to allow these footnotes; this journal is no exception (cf. Arun Kumar, A. N., Srinivasa, Y. B. and Chauhan, S. S., *Curr. Sci.*, 2002, **83**, 809; Soni, G. V. *et al.*, this issue, 1464). Why is it so important to be the first author or to establish equality with the first author? This is largely because a scientist’s worth is most often judged by the

number of times his or her name appears as the 'first author' or the 'corresponding author', who presumably is the general marshalling his armies in battle. As the number of authors on an average scientific paper increases the issue of credit sharing becomes more difficult. In many disciplines several groups, with varied technical skills, collaborate to produce major pieces of research.

In thinking about the practice of assigning authorship credit in science, my attention was drawn to a provocatively titled commentary: 'Who wrote this paper anyway', authored by John Hoey, the Editor of the *Canadian Medical Association Journal (CMAJ)*, 2000, **163**, 716–717). Hoey draws attention to a famous paper in the journal he now edits entitled 'Pancreatic extracts in the treatment of diabetes mellitus. Preliminary report' (Banting, F. G., Best, C. H., Collip, J. B., Campbell, W. R. and Fletcher, A. A., *CMAJ*, 1922, **22**, 141–146). This was the paper that announced the discovery of insulin, revolutionizing the management of diabetes. In 1922, this was a paper marked for its interdisciplinarity; physiology, biochemistry and clinical medicine had to coalesce for the discovery of insulin to be made. Interestingly, the 1923 Nobel Prize for medicine would go to Frederick Banting and John Macleod. In one of the most celebrated episodes of Nobel controversy, Banting, who felt that Macleod was undeserving shared his prize money with Charles Best, the man who developed 'the initial crude method of extracting the substance that would later be named insulin'. Macleod shared his prize money with James Collip, who 'refined the extraction process'. Discerning readers would note that Macleod's name does not appear on the list of authors of the original *CMAJ* report. In discussing in his commentary a statement on authorship issued by the International Committee of Medical Journal Editors (ICMJE, Vancouver 2000), Hoey notes that Macleod who 'made original contributions to the design and interpretation of the research' should have probably been an author. He goes on to add: 'But the corollary of *credit* is the ability to take *responsibility* for what is written. These are the twin attributes of authorship'.

The twin issues of sharing credit and responsibility have acquired a new dimension in the wake of the series of publishing scandals that have rocked science in recent times; most recently physicists have woken up to the fact that misconduct and deviant behaviour do not recognize national or disciplinary boundaries. The cases of Jan Hendrik Schon at Bell Laboratories and Victor Ninov at Lawrence Berkeley National Laboratory appear to have been resolved as straightforward cases of data falsification. Schon's work on solid-state electronic devices and molecular electronics and Ninov's contribu-

tions to the discovery of elements 116 and 118 are generally recognized to have been fabricated. The motivations are, as always, unclear; although the possibility has been advanced that these authors succumbed to the temptation of claiming success for experiments which will eventually work. But individual aberrations aside, the papers of Schon and Ninov carried an impressive and distinguished list of coauthors. The investigating committee examining the Schon affair shies away from questioning the responsibility of coauthors, labelling the problem as 'an extremely difficult issue, which the scientific community has not considered carefully' (*Chem. Engg. News*, 4 November, 2002, 31–33).

Closer to home, the case of B. S. Rajput, a Vice-Chancellor of a University has been widely written about. Extensive plagiarism has been alleged in a series of papers in the area of high energy physics (2002 may be remembered as the year physics lost its innocence). In this case the extraordinary defence has been advanced, that the 'corresponding author' was unaware of the publication. The question of how authorship of scientific papers must be granted is difficult to resolve. But, many unethical practices in our midst must be recognized. The inclusion of 'honorary authors' who hold important administrative positions in laboratories must be eliminated. Sometimes, the sharing of responsibility may act as a deterrent.

But, the changing face of publishing in science is most clearly evident in some of biology's mega-projects. The announcement of the 'Initial Sequencing and Comparative Analysis of the Mouse Genome' carried a simple author byline—*Mouse Genome Sequencing Consortium*. Readers must turn to the end of a long article to find a list of over two hundred authors from 46 different laboratories. Curiously, the paper carries another footnote which identifies 16 authors as having contributed to 'project leadership' (*Nature*, 2002, **420**, 520–562).

Charles Dodgson did not use his famous pseudonym when he wrote: 'Man is an animal that writes letters'. We might borrow his turn of phrase to define scientists as animals who like to publish papers. A defining characteristic of this tribe is their desire to see their names in print. Author bylines which highlight contributions to leadership, experimental work, analysis or even manuscript preparation are beginning to appear. Competing financial interests of authors or their lack must be declared in some journals. Clearly, the mores of publishing in science are in the midst of change.

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