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EDITORIAL

Scientific Writing and English

The Hatter opened his eyes very wide on hearing this; but all he said was, 'Why is a raven like a writing desk?'

'Come, we shall have some fun now!' thought Alice. 'I'm glad they've begun asking riddles. – I believe I can guess that', she added aloud.

'Do you mean that you think you can find out the answer to it?' said the March Hare.

'Exactly so', said Alice.

'Then you should say what you mean', the March Hare went on.

'I do', Alice hastily replied; 'at least – at least I mean what I say – that's the same thing you know'.

'Not the same thing a bit!' said the Hatter. 'You might just as well say that "I see what I eat" is the same thing as "I eat what I see"!'

'You might just as well say', added the March Hare, 'that "I like what I get" is the same thing as "I get what I like"!'

'You might just as well say', added the Dormouse, who seemed to be talking in his sleep, 'that "I breathe when I sleep" is the same thing as "I sleep when I breathe"!'

—Lewis Carroll

Alice's Adventures in Wonderland

The *Mad Tea-Party* and the combined assault on Alice's language, by that admirable trio of the Mad Hatter, the March Hare and the Dormouse, came to my mind as I struggled to read two Ph D thesis drafts and, of course, a bundle of correspondence for *Current Science*. Doctoral theses describe years of work by students enrolled for Ph D degrees, often running to a couple of hundred pages of text. Ph D theses are difficult to read and I have often wondered whether examiners really wade through the entire text. In our institutions, the Ph D thesis is sometimes a collective responsibility of the student and the research supervisor. At the level of day to day research, students and their guides usually develop a convenient working relationship, where individual responsibilities are often clearly defined. Usually the students do the laboratory work; supervisors help in analysing results and write manuscripts. Rarely does one come across a student, who produces a clear and readable manuscript, without any help. Correcting a draft Ph D thesis can be an ordeal.

Even as I try to complete two such exercises at the same time, I must reflect on why most students (and indeed many authors who contribute to this journal) write so poorly.

The Indian Institute of Science, where I work, is truly an all-Indian institution. Students are drawn from all parts of the country and come from widely varying social and economic backgrounds. They have been educated at schools, colleges and universities dotted across the length and breadth of India. Most of them are bright, motivated, hard-working and committed to their research. But, a large number share a disability; they are unable to write clearly and correctly in English. They are unable to follow the March Hare's dictum and 'say what they mean'. I suspect a similar situation must exist across the country, with clear scientific writing skills becoming a rare commodity. The teaching of English in schools has deteriorated dramatically over the years, even in the so-called English medium schools. Students who study in schools that use the state language as the medium of instruction, face a formidable hurdle when they enter university science courses. Curiously, even students who appear to speak English fluently, write very poorly. Grammar and spelling are not considered important. This slide in style is being catalysed by e-mail and SMS, where complete words and sentences are to be avoided and punctuation is forbidden. Even when writing skills are adequate, the task of writing a Ph D thesis can be daunting. A book entitled *Writing Your Thesis* by Paul Oliver (Sage Publications, 2004) recently crossed my desk. In a little less than 200 pages, the author provides a detailed set of instructions on preparing a thesis, including a short section entitled *Grammar, Punctuation and Conventions of Academic Writing*. In discussing writing conventions, he has a nugget to offer: 'Consistency is perhaps more important than the choice of convention which has been made' (p. 78). There is nothing more distracting in manuscripts than undefined abbreviations, multiple systems of units (for example temperatures quoted in degrees Celsius and Kelvin, interchangeably) and ever-changing nomenclature of molecules. It is also common to see a complete disregard for the significance of numbers. The terms, precision and accuracy, mean little to most authors. In many manuscripts submitted to this journal and in many theses I have read, references are cited with a cava-

lier disregard for accepted style; even more annoyingly citation style is often inconsistent within a single list of references. A lack of discipline in writing, coupled with linguistic disabilities, makes most manuscripts, both theses and papers, hard to read and sometimes impossible to correct. An example that I might cite is the case of the *Correspondence* columns of this journal. In many letters (and these are intended to be brief) that are received it is hard to decipher what the author is trying to say. Sometimes these are edited (with considerable difficulty) and published with the author's concurrence. But, I am left wondering; did the author eventually say what he meant?

Scientific writing, theses or papers, is intended to present clearly the purpose and outcome of a specific research investigation. It is important to be both succinct and explanatory. Authors do not usually have the luxury of following the King's sage advice to the White Rabbit in *Alice's Adventures in Wonderland*: 'Begin at the beginning and go on till you come to the end: then stop'. When the moment of writing arrives many authors confront a formidable mental barrier. Laboratory research seems so much simpler and enjoyable. There is an urge to postpone writing and both students and supervisors suddenly find so many more important things to do. Oliver notes in his introductory paragraphs: 'Writing is a largely solitary process, and progress may seem to be very slow. The task may seem to stretch away to infinity'. He, of course, notes optimistically that 'this book will help you with writing your thesis, from the moment you type your first word, to when you walk into the viva voce examination to defend the completed work!' The general reading habits of most students in our institutions is limited and I am not sure too many will have the patience or the inclination to study Oliver's prescriptions. It may indeed be easier to transfer the burden of writing correctly to a supervisor. This attitude also surfaces in a lot of correspondence that crosses my table at *Current Science*. Many authors believe that their results are so important that the task of editing, tightening and correcting language must be, automatically, the responsibility of the journal. A most annoying class of authors are those who prepare manuscripts carefully for 'high impact' journals, but treat our own journals with contempt, by submitting manuscripts that do not seem to have been read carefully by any of the authors. There are also 'senior authors', academicians and managers of science occupying positions of power and authority, who believe they cannot be asked to condense or correct the most verbose and poorly written manuscripts.

Science communication, both spoken and written, is carried out overwhelmingly in English. Even in the 1960s and 1970s German and French seemed important, with many major journals publishing in these languages. Russian was becoming important; libraries paid an enormous cost to buy cover-to-cover translations of journals emanating from the erstwhile Soviet Union. The influence of 'market forces' was evident in scientific publishing even before

the phrase became popular. German and French journals, many with a long and proud history that dated back to the 19th century (a time when modern science began its triumphal march in Europe and in England), slowly converted themselves into journals that published papers in English. *Annalen der Physik*, *Liebig's Annalen der Chemie* and *Chemische Berichte*, famous journals of yore, simply disappeared from our consciousness. The highest impact journals published from Europe today appear in English; even professional societies that were constrained by language and national boundaries have integrated across Europe. In a delicious irony of history, English is the language that binds European science, even as England's political and economic influence has declined. The events of the early 1990s, particularly the dramatic disintegration of the Soviet Union, has hastened the process of acceptance of English as the language in which science is transacted. Globalized economies require a link language; the evolutionary forces of history have selected English. In preparing for future challenges, Russia and China invest heavily on the teaching of English, a language that is necessary if the next generation has to be competitive and successful. In the countries of Eastern Europe, liberated from Soviet dominance, English has moved smoothly into the position of an essential second language.

In India, English was taught widely and, possibly, well. The divide between urban and rural schools was, inevitably, very substantial. But, in exorcising the ghost of Macaulay, the language policies of the 1960s converted, the teaching of languages in our school education system into a formidable obstacle course. The average child burdened with the study of three languages, most often taught indifferently, does not learn any of them well. Unsurprisingly, we produce students, who enter the higher education system with a significant handicap, despite their intrinsic talent. The language policies in India were framed in the backdrop of the intense anti-Hindi agitation that took place in the state of Madras (now Tamil Nadu), almost exactly forty years ago. The drive to impose Hindi, which had considerable political support, was halted and English retained as a link language in which the Central Government transacted its business. The formulae which emerged in the cauldron of the 1960s have placed a major educational burden on future generations. In a provocatively entitled article 'Hindi against India' (a title borrowed from a book by Mohan Ram on the 'official language controversy'), Ramachandra Guha writes about the political transformation in Tamil Nadu, in the years that followed: 'Not for the first (or indeed last) time, linguistic chauvinism has carried with it a massive political cost' (*The Hindu*, 16 January 2005).

In evaluating the role of English in our educational system, we must ensure that sentiment does not force us to pay an unaffordable developmental cost.

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