



From the editor's desk:

'Scientific' writing

by Elise Langdon-Neuner

The theme of this issue of TWS is 'scientific' writing. The issue gathers together thought-provoking articles that discuss current writing practices and articles that offer valuable guidance on improving writing style. In this editorial I take more space than usual to consider the background for the traditional 'scientific style' of writing, the warnings for those who support this tradition and how we as medical writers can contribute to a future of readability and clarity in medical reports.

Scientific writing, including medical writing, is a marvel. In a world of marketing slogans and sound-bites, archaic text flourishes in scientific journals and overflows into regulatory documents. This editorial concentrates on journal articles but it is notable that Linda Tollefson, Director of the Food and Drug Agency Europe Regional Office, stated at the EMWA conference that badly written documents would be rejected by the agencies (see page 77 of this issue). There is little research on whether badly written papers are rejected by journals. Research on one journal suggested a correlation between the number of papers with shorter sentences and simpler grammatical structures and acceptance rates in that journal [1].

Remember while celebrating the 150th anniversary of the publication of Darwin's *On the Origin of Species* this year that the great man published all his books for general readerships. Stephen Jay Gould, an eminent modern Harvard palaeontologist, acclaimed essayist of genius, and co-author of the revolutionary and now generally accepted "punctuated equilibrium" theory¹, believed that "the concepts of science, in all their richness and ambiguity, can be presented without any compromise, without any simplification counting as distortion, in language accessible to all intelligent people" [2].

Yet the hallmarks of 'scientific style' are not easy accessibility, but long complex sentences overburdened with unnecessary words², noun constructions in preference to active verbs, and a disproportionate use of the impersonal passive voice. The word choice is pompous (e.g. elucidate, employ, perform rather than explain, use, do), jargon is rife

and instead of precision opinions are hedged with uncertainty. Articles in which contributions of medical writers are acknowledged can also adhere to this style. Richard Smith, when he was still editor of the *British Medical Journal*, warned me at the beginning of my career that medical writing would surely kill any writing talents that I might have.

What forces are operating to maintain the grip of the 'scientific style', and are they cutting off the scientific nose to spite its face? Tim Albert describes in his article in this issue how he gave up on his mission to help scientists mend their misguided writing ways. He blames the role of the publishing system. It is true that even the emerging open-access revolution in publishing is having no effect on writing style, as Neville Goodman points out in his commentary in this issue, while blaming the education system for the current state of medical writing. Not only the education system itself but the authorities it relies on might be at fault. The 50th anniversary this year of another book classic, Strunk and White's *Elements of Style*, is not a cause for celebration for the professor of linguistics Geoffrey Pullum or for Alistair Reeves, as you can read in this issue.

I find it hard to avoid the conclusion that the central reason for scientists, who we assume are clever people, writing in such an obscure style is to persuade the confused reader that they are indeed clever people. Linguists who study the genre of academic articles have acclaimed them as a code of communication among experts. They reason that the use of sound-good words and complicated sentences boost the author's status within that community, which they see as the underlying rationale of the scientific paper [3].

Michael O'Donnell, former editor of *World Medicine*, is convinced that typical medical writing prose, which he describes as 'decorated municipal gothic', is merely used by authors to enhance their image [4]. The explanation for him lies in article publication being viewed by scientists as merely another line in their curriculum vitae. Their main aim is to be cited—not read. O'Donnell says the reader has

What forces are operating to maintain the grip of 'scientific style'?

That is how we got to where we are today but it doesn't explain why we stay there

¹ The theory states that the process of evolution is not gradual, as previously thought, but proceeds in fits and starts with long periods of stability.

² see the seventh paragraph of the article by Alistair Reeves (page 90)

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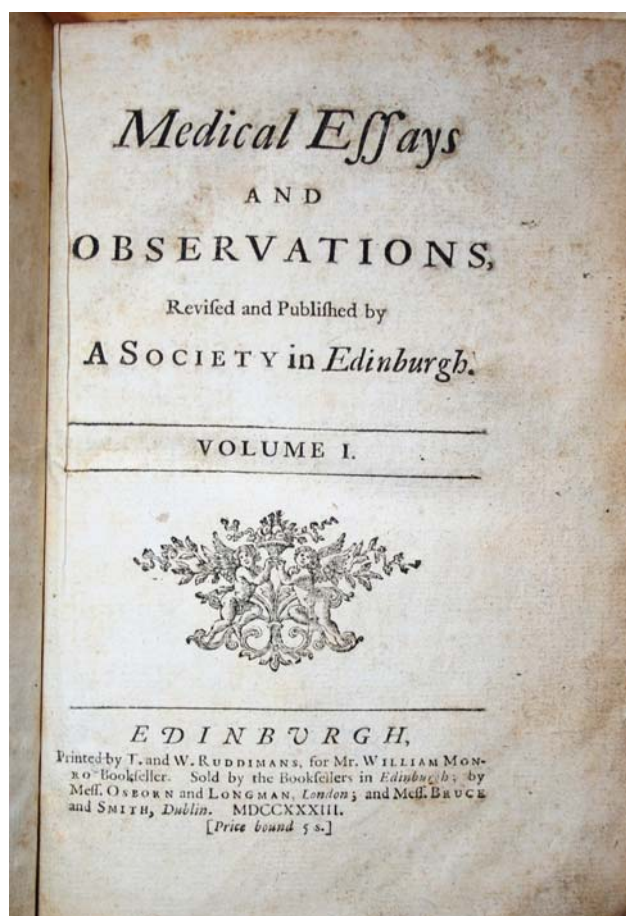
two choices “do the writers’ work for them by trying to work out what they are trying to say, or throw the journal aside and set about doing something less demanding like quarrying granite.”[5] (See the box on this page for how he believes a simple text written in 1885 might be written today.) Indeed, articles are not usually read cover to cover as Jo Whelan points out in her article in this issue, in which she highlights the problems of journalistic reporting of medical research. But she reasons that articles in medical journals are individual pieces of research only of interest to a few people—a parallel argument to Tim Albert’s one of exclusivity.

Nevertheless, some scientists who have no need to prove that they are clever have criticised ‘scientific style’ for the overuse of the passive and impersonal voice, which leads to complicated text. The Nobel Prize winner Roald Hoffman (Chemistry 1981) lamented that these objective articles present a sanitized account of the study [6]. Most of the obstacles that the researcher faced are omitted—and why?—again because this leaves the text reading like a success story to make the reader think better of the author. But he says it damages the scientist’s image, because the scientist’s humanity is suppressed and the public is left with the impression that scientists are dry and insensitive people who remain within a jargon-barricaded world and do not deign to explain their work to the public in terms that the layman can understand. Peter Medawar, another Nobel Prize winner (Physiology or Medicine 1960), points out that the inductive format of articles is anyway a nonsense because scientific observation is inevitably biased starting with the choice of method and followed by the selection of results considered relevant [7].

How did this state of affairs come about in the first place? In the 17th century the early experimentalists, in particular Robert Boyle and his fellow members at the Royal Society, were keen to distinguish their empirical methods from the scholarly theories by which classical and medieval philosophers tried to explain Nature. These natural philosophers, as they were called, had told ‘the truth’ in front of witnesses. The experimentalists sought to style their writing so as to separate the facts, which they presented in detailed accounts of their methods and observations, from their own opinions, which they hedged with caution. Additionally, according to Steven Shapin (as quoted in [8]) early experimentalists wrote with deliberate prolixity, i.e. “ornate sentence structures, with apposite clauses piled on each other”. And here we return again to the image problem, such language was used to impress their readers with their intellectual prowess and establish their authority.

Even so, the early experimentalists did not feel compelled to write in the passive voice. They used active-voice verbs and first-person pronouns to emphasise that they had witnessed the experiments themselves. The change in emphasis from active to passive and first-person to impersonal came later.

The linguist Dwight Atkinson specifically traced changes



The front cover of *Medical Essays and Observations*, revised and published by a Society in Edinburgh (1733) reprinted with the kind permission of the College Library at The Royal College of Surgeons of Edinburgh.

BOX

The following is an extract from William Marsden’s report relating to the founding of the Royal Marsden in 1851:

A hospital devoted to the treatment of cancerous disease seems to me to hold out the only prospect of progress in the treatment of the malady; an institution conducted by those who recognise in medicine and surgery but one art. The records of such an institution are sure, in time, to narrow the field of incurable disease¹.

This is how Michael O’Donnell judges a lesser Marsden would write the report today:

It would seem to the author that only a specialist centre organised on the basis of concentrating its resources solely to address the treatment of the malignant disease process could offer a potential for realistic improvements in treatment outcome. Furthermore, such an institution would be a de facto resource centre under the direct line management of personnel sensitive to the fact that multifaceted discipline of medicine and surgery are each essentially manifestations of the same single entity

¹ This extract is from Sandwith F. Surgeon compassionate. London: Peter Davies, 1960:210 as reported in [5]



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in medical writing style and gives an insight into how articles in medicine lost their 'personal' character. He examined original articles published in *The Edinburgh Medical Journal* from 1735 to 1985 [8]. Early issues of the journal contained case studies centred on one patient. At that time symptoms were believed to be unique to the patient rather than to the disease. Only those who could afford to pay received treatment. Doctors were eager to please and were 'involved' with individual patients who were their sole source of income. They wrote in a personal and emotional style about their patient and the treatment they applied. At the end of the 18th century the emphasis in original articles started to shift from narrative to non-narrative text, concentrating on the disease and grouping patients according to their disease. Text became more informational, as typified by heavy noun phrases, and also less emotionally involved. Atkinson attributes many of these changes in medical reports to the onset of public medicine.

Emotion was dropped and authors hide themselves behind the facts in reporting other sciences too (see boxes on pages 86 and 88 for examples of emotions previously expressed in science writing). The current frequent use of the passive voice in research articles for instance has been explained as reflecting today's 'instrumental and object-oriented' in contrast to yesterday's 'actor-oriented' science [9].

That then explains how we got to where we are today with the scientific article. The early experimentalists felt they needed to impress their readership with their objectivity and authority through prolixity and as time went on social changes supported the demise of first-person pronouns. But it does not explain why, in a changed world, we stay there. Why does writing have to be deliberately complicated, devoid of human emotion, and the active voice and first person pronouns ostracised? The stranglehold of tradition and peer pressure that maintains the status quo is not to be underestimated. I recently read a reviewer's comments on a manuscript admonishing the author for using 'colloquial expressions', e.g. 'huge difference' and 'we guess'. The author wanted his article to be published and made the changes.

Answering his own question as to why the pleas to write in plain language that have been bombarding scientists for the last 300 years have gone unheeded, Martin Gregory, a veterinary scientist writing in *Nature*, says—at one with Tim Albert—that the pleas should instead be directed to editors [10]. John Kirkman, who—like Tim—is an experienced medical writing trainer, reviewed 500 sets of Instructions

for Authors and found that 82% of the instructions gave no helpful guidance on writing style [11]. Interestingly, he also found that only two specified an impersonal or passive style suggesting that this 'requirement' of scientific style is a more a myth than a reality. Kirkman felt that editors could do more to guide authors and to dispel the impression that acceptable articles must be written in a traditional style. While for Gregory the problem of unreadable prose could be solved at a stroke by stipulating that editors should have expertise in writing and should reject poorly written papers.

It is certainly a mistake to think that all journal editors commend the traditional style of writing published in journals. In some, like *Nature*, plain writing and the active voice are encouraged (voice should actually be allowed to select itself, see David Alexander's article in this issue). Richard Webster wrote a scathing editorial to mark the end of his term as editor of *European Journal of Soil Science* bemoaning the fact that the papers he had received during his editorial term had been mostly devoid of excitement with the passive voice and third person as the main reasons for the dullness [12]. He also blamed the passive for leading authors into the 'dangling participle'² fault. Beyond the passive and third person he had had to contend with long-winded, rambling and pompous constructions and strings of adjectival nouns that leave readers guessing which noun qualifies which other noun.

Ken Hyland, one of the linguists who studies I have already mentioned, accepts that this writing style excludes lots of

Science can be reported in language that is "accessible to all intelligent people"

people, but adds that this is partly the point (personal communication). But this bodes ill for scientists themselves.

In the conclusion to his book *Bold Science*, Ted Anton draws together the common characteristics shared by the seven scientists he profiles in the book as those in the forefront of a new wave in science who are changing what scientists are [13]. These scientists, who include Craig Venter and Saul Perlmutter, have all used the media to their advantage breaking down barriers between science and the public. The immunologist Polly Matzinger refused to write her papers in the passive. She felt to write 'I' would be over conspicuous and so as to write 'we' added her Afghan hound's name as co-author in an article published in *The Journal of Experimental Immunology*. When the true identity of her co-author was discovered she was banned from publishing further papers in the journal. She turned to the media to reach other professionals and the public. Anton also stresses the importance of interdisciplinary connections for the future of sci-

² A present participle is a verb ending in *-ing*, and is called *dangling* when the subject of the *-ing* verb and the subject of the sentence do not agree i.e. it seems to modify the object instead. <http://andromeda.rutgers.edu/~jlynch/Writing/d.html>

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ence. In an age of high specialisation it therefore becomes more, not less, important to develop skills of communication, not least to facilitate cross-fertilisation between ever-more specialised disciplines.

Any doubt that science can still be written in a plain and even literary style is dispelled by the collection of extracts of scientific writing from professional scientists that Richard Dawkins has gathered together in his book *The Oxford Book of Modern Science Writing* [14]. The extracts are not from research articles, but from writings intended for public consumption. Nevertheless they include dry, complex and unlikely topics, e.g. from Primo Levi's *The Periodic Table*. Probably it is no coincidence that a large number of the authors were Nobel Prize winners. Researchers who want to be separated from the crowd would do therefore well to step back and consider how and to whom they communicate their research. Submission to peer-pressure is not the mark of those who excel in our society.

There is another point which specifically relates to medical writing and is ably brought out by David Reese in his article calling for the literary element to be restored to medical writing [15]. He argues that medicine is fundamentally a social and personal act and asks how, if the literature of medicine is devoid of human sentiment, it can truly reflect the methods and aspirations of medicine—a poignant comment in the light of the increasing use of the Internet by patients seeking medical information. The general public stands today on an equal footing with researchers. It demands to be informed and is not impressed by arrogant endeavours by authors to set themselves above the intellectual norm.

Those who stick to traditional 'scientific' writing therefore risk mediocrity and disregard from the general public.

However, before we resort to a journalistic style of reporting in scientific articles, the practices currently adopted by journalists that Jo Whelan refers to in her article need to be replaced by responsibility for content. Richard Clark likewise, in his article in this issue which tackles medical writers' responsibility, is concerned about a lack of attention to content. There is an evasion of responsibility implicit in traditional scientific writing which has been brought about by the objective, inductive format mentioned by Peter Medawar. Surely this will become increasingly unacceptable in a world that is learning tough financial lessons consequent upon its failure to impose responsibility on the managers of its finance. Is health not more important even than finance? Should a change in writing style not be part and parcel of the tremendous pressure for authorship transparency reflected in ghostwriting guidelines and surveys such as the one of EMWA and AMWA members reported by Adam Jacobs in this issue. The logical sequel to these important concerns of editors and the public should be the use of 'we' and 'I', more writing what we mean rather than evasive hedging.

Besides taking responsibility for our own work and per-

suading authors to do likewise, what can medical writers do for the future of medical writing? We are writing an ever-increasing number of scientific articles and we claim to be experts in writing who add value by writing well. Therefore, we can hearten the disillusioned trainers and add our voice to theirs and those of enlightened scientists and editors by recognising that complicated or pompous writing should be avoided in the interests of good quality, even for the run-of-the-mill researchers who are only looking for their next promotion rather than a Nobel Prize. We can write and defend—by demanding explanations to make misguided editors and reviewers reflect on their position—language that is “accessible to all intelligent people”.

This issue of *TWS* offers many excellent articles including one on writing for readability in which David Alexander advises on the principle of subject-topic agreement, judicious use of the passive, preferring active verbs to nouns and distinguishing between terminology and jargon. While Alistair Reeves explains the correct use of the preterite and present perfect tenses and Iain Patten contributes suggestions on clarity in describing and using secondary citations. With these articles and more in *TWS* the future of medical writing could be marvellous.

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References:

1. Coates R et al. Language and publication in *Cardiovascular Research* articles. *Cardiovasc Res* 2002; 53: 279-85
2. *Wonderful Life: The Burgess Shale and the Nature of History* by Stephen Jay Gould; W. W. Norton; 1989; ISBN 0-393-02705-8
3. K Hyland K and Salager-Meyer F. *Scientific Writing. ARIST (Annual Review of Information Science and Technology)*. 2008;297-339
4. O'Donnell M. The toxic effect of language on medicine. *Journal of the Royal College of Physicians of London* 1995;29(6):525-529
5. O'Donnell M. Evidence-based illiteracy. Time to rescue “the literature” *The Lancet* 2000;355:489-491
6. Hoffmann R. Under the surface of the Chemical Article. *Angew chem. Int Ed Engl* 1988;27(12):1593-1764
7. Medawar P.B. Is the scientific Paper a fraud? *The Listener* September 12 1963 page 377-378
8. Atkinson D. The Evolution of medical Research Writing from 1735 to 1985: The Case of the Edinburgh Medical Journal. *Applied Linguistics* 1992;13:337-374
9. Salager-Meyer, F, G. Defives and M. Hamelinsck. Epistemic modality in 19th and 20th century medical English written discourse: a principal component analysis. *Journal of Applied Linguistics*. 1996;10(2):163-199.
10. Gregory MW. The Infectiousness of pompous prose. *Nature* 1992 360;11-12
11. Kirkman J. Third person, past tense, passive voice for scientific writing. Who says? *European Science Editing* 2001;27(1)4-5.
12. Webster R. Let's re-write the scientific paper. *European Journal of Soil Science* 2003;54:215-218
13. Anton T. *Bold Science*. W.H. Freeman and Company New York, 2000; ISBN 0-7167-3512-1
14. Dawkins R. *The Oxford Book of Modern Science Writing*. Oxford University Press, 2008; ISBN 978-0-19-921680-2
15. Reese DM. Restoring the literary to medical writing. *The Lancet* 1999;353:585-586