Editorial

This issue is something of a pioneering experiment. One of the pressing issues of our time is the accessability of scientific research results to the general public who, in our present era, via the taxes they pay to the government, fund the overwhelming majority of scientific research. As Francis Bacon long ago pointed out, science is undertaken not only to acquire knowledge for its own sake, but also, as he put it, "for the relief of man's estate" [1]. The latter could mean simply more comfort and convenience [2], more leisure time to be spent in thinking rather then sheer survival [3], or increased mastery over nature [4]—or a blend of all three.

The traditional mode of dissemination is via a paper in a scientific journal, or a scholarly monograph. These publications are typically locked away in specialist libraries.[1]

One of the motivations of the so-called "open access" movement is to remedy the problem of inaccessibility: instead of scientists publishing their papers in learned journals, to which the libraries of universities and research institutes and some individuals (especially members of the learned societies that, traditionally, publish the journals) subscribe, authors pay a journal to publish their paper. Most, if not all, of these "open access" journals exist online only, which means that publication costs are lower than those of traditional print journals. Nevertheless, what has apparently become the accepted cost, the "article processing charge" or APC, is quite expensive—typically between $1000 and $2000 per article.[2]

Apart from the fatal weaknesses of the open access model,[2] its promoters seem to have missed a major feature: Namely, scientific papers are almost, or wholly, unreadable by members of the general public, or even, increasingly, by scientists working in other disciplines. The unreadability appears to come from a combination of specialist vocabulary and an esoteric style. The former is not such a great problem and can usually be solved by referring to a dictionary. The latter accounts for most of the impenetrability.[3]

Traditionally, therefore, members of the general public have had to rely on science journalists to report on significant new discoveries of facts and formulations of theories, both via the regular science columns in newspapers,[4] and in books. This has the obvious weakness that the journalist cannot be expected to have deeply mastered the areas of knowledge about which he or she writes; very often these areas cover the whole spectrum of mathematics, science and engineering and the journalist may at the same time be responsible for other columns such as business and travel. It seems scarcely possible for the very necessary critical appraisal to form part of this kind of reporting.

A much more favourable, but much rarer mode of bridging the gap between the research paper or specialist monograph and the general public occurs when a scientist essentially transforms himself or herself into a writer, possibly temporarily, to give a profound insight into a particular topic. An early example was Einstein's little book "The Meaning of Relativity" [7]. Such books combine both profound knowledge with readability and breadth of vision, covering not only the science itself but all its implications, the full exploration of which may

---

[1] Note the "Access to Research" initiative that, since 1 January 2014 in the UK, offers online access in public libraries to slightly more than 8000 journals published by big commercial publishers.

[2] There are a number of rather obvious weaknesses to this mode of dissemination. Firstly, it discriminates in favour of well funded institutions—in other words, it promotes plutocracy. Admittedly a significant quantity of experimental research is expensive; the cost of carrying out the work reported may be hundreds of times more than the APC, which can, in consequence, reasonably be charged to the research budget. But there are equally significant kinds of research, including mathematics, some observational sciences and many kinds of theoretical work, for which the expenses may amount to no more than the cost of pencils and paper, costing less than a hundredth of the APC. Secondly, the whole arrangement smacks of "vanity publishing", in which authors pay an organization to publish their work; there is, in fact, no difference in principle between vanity publishing and advertising. Thirdly, whereas a traditional publisher will strive to publish the best quality research in order to keep its reputation and subscribers, the "open access" journal's income depends only on the number of papers it publishes, for each of which it receives the APC. "Open access" journals are, therefore, motivated to publish as many papers as possible, which relentlessly drives down quality [5]. It should be added that many traditional journals have somewhat sullied their reputations in recent years by chasing "impact factor" rather than quality. In other words, they seek to publish popular papers that will be heavily cited, among which sensational papers loom large. This is presumably the reason for the growing number of paper retractions on grounds of irreproducibility or downright fraud.

[3] In mediaeval times it was a conscious aim, an attempt to resolve the tension between keeping unique possession of a valuable piece of knowledge and showing the world that one had obtained it. A supreme example was Robert Hooke's initial publication of his famous law *ut tensio, sic vis* as an anagram, *ceiiinosssttuv*. Gradually, though, readability came to be the aim; many 20th-century scientific papers are remarkably accessible to a wide readership, with the zenith perhaps being reached around 1950 [6]. Since then there seems to have been a movement back towards inaccessibility.

[4] Their quality varies widely. For many decades the *Neue Zürcher Zeitung* led the field. Even scientists appreciated the succinct writing and conscientious referencing of the articles.

doi: 10.4024/22RA14E.jbpc.14.04

require a mastery of other fields. The scientists themselves usually welcome the opportunity to write such a book, for it allows them to explore their own subject from a loftier viewpoint. Yet, very often these books are written after the author has ceased to be an active researcher.[5]

In this issue of *JBPC*, however, scientists in the midst of their research have attempted to write about a field of pressing importance, not only to themselves but to people directly affected by the health (and safety) implications. Among the branches of human knowledge, health lies in a special category because, without good health, man's ability to do anything else is severely impaired. We are often content to let practised specialists take care of many aspects of our lives, whether plumbing, accounting, food preparation, repairs to our automobile or some part of our body, or piloting us through the air to a distant destination, but since health concerns us so directly and immediately, we feel that the more control we have over it ourselves, the better. Although the layman can but rarely acquire the full breadth and depth of knowledge possessed by the ideal medical practitioner, nevertheless as individuals we have one practically irreducible advantage, that of knowing our anamnesis in intimate detail. The multifarious influences that might have an impact on our health, such as nutrition, sleep and so forth, are really known only to us as individuals and, if any serious attempt is made to capture it in writing (and usually it is not), it is likely to be an approximation so poor as to be misleading rather than enlightening. There is, therefore, a special onus on each of us to acquire as much knowledge and understanding of relevant aspects of health as is possible. This issue is intended to facilitate that task; the intended readers are, firstly, those whose health might have been affected by occupational exposure to neurotoxic organophosphates in aircraft and, more widely, all those who may in the future undertake a journey involving jet airliners.[6]

J.J. Ramsden

References

1. Bacon, F. *The First Book of Francis Bacon of the Proficience and Advancement of Learning Divine and Human*. London: Henrie Tomes (1605) [reprinted in: *The Works of Francis Bacon* (eds J. Spedding, R.L. Ellis and D.D. Heath), vol. 3, p. 294. London: Longman et al. (1857)].
2. Kaku, M. *Visions*. Oxford: University Press (1998).
3. Ramsden, J.J. *Applied Nanotechnology*, ch. 2. Burlington, Mass.: William Andrew (2009).
4. Spengler, O. *Der Mensch und die Technik*. Munich: C.H. Beck (1931).
5. Beall, J. Scholarly open-access publishing and the problem of predatory publishers. *J. Biol. Phys. Chem.* **14** (2014) 22–24.
6. The paper by A.M. Turing, The chemical basis of morphogenesis, *Phil. Trans R. Soc. Lond. B* **237** (1952) 37–72 is exemplary in this regard.
7. Einstein, A. *The Meaning of Relativity*, 2nd edn. London: Methuen (1924).

[5] A well known example is Sir James Jeans, who made a conscious decision at some point in his career to abandon the leading edge of research and devote himself to popular exposition.

[6] Readers are alerted to the fact that genetic and epigenetic factors that may underlie the differential sensitivity of individuals to the effects of exposure are not directly discussed in this issue.