THE FUTURE OF BIOMEDICAL COMMUNICATION; A SYMPOSIUM*

I. Perspective from the editor of the 
British Medical Journal

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I am going to base this presentation on the belief that perhaps in the title given to this session there is an implied criticism of the current state of affairs, together with a suggestion that I might try to put them right. Futurology is always a risky business, but I won’t avoid it.

I would like to start with a little history, then take a look at the present, and finally make some remarks about the future. Nevertheless, my emphasis will not be on structure. New developments, such as full texts online and CD-ROMs, may be important—but they’re only another medium, no more and no less important than the printed format of a journal. Nobody so far has used the unmentionable words “literature explosion,” but if we are to survive this state of affairs, which will not only continue but get much worse, then one solution is that all of us need a totally new approach. This new approach is not, of course, really new but has never been implemented: all of us should learn to distinguish quality among publications. It would classify both journals and articles on their likely potential value, and it is here that you, librarians and information scientists, could have a key role. But I am afraid that there is another outcome which is much more likely and much more messy: things will go on as they are. Journals will proliferate, the standard of most articles will go on being as depressingly low as at present, and we shall be making the same sort of complaints in fifty years’ time.

First of all, complaints about how impossible it is to keep up are not new. Here are three quotations, taken at roughly fifty-year intervals: “Publication of such matter steals away the poor hours of leisure of the man of science” (J. N. Langley, 1899); “Science is in danger of suffocating in its own secretions” (Sir Robert Hutchinson, 1940); “Issues related to the information explosion are among the most critical facing the health sciences today” (Mary Ann Payne, 1989). At the time the first quotation was made, there were probably no more than 1,000-1,500 biomedical journals; at the time of the second, the number had risen to 5,000-6,000; and today the number is around 25,000. But as Price has shown, there has been no real literature “explosion”—merely a steady progression in the number of new scientific journals started since they first began being published in 1665 [1]. We know that the growth in journals parallels growth in the number of scientists. Price then went on to show that science evolves into disciplines, subdisciplines, and sub-subdisciplines. New varieties of these start every ten years or so out of so-called “invisible colleges” and each one requires its own journal, where, initially, the readership is identical with the authorship. So we get our well-known hierarchy of journals into five or six tiers, which is still evolving today.

IS JOURNAL PROLIFERATION SLOWING?

There have been suggestions that, like all exponential systems, this one is slowing down [2]. Nevertheless, these data are soft and I know of at least one journal, listed in the Index Medicus, which is not included in these figures. And certainly in the third-world countries, which I know fairly well, there is no sign of a slowdown, though the journals do not appear in world lists.

What has been explained recently is the popular impression of a literature explosion. Edward Huth, editor emeritus of the Annals of Internal Medicine, has shown that, over the past thirty years, there has been a consistent ratio between the number of journals received at the National Library of Medicine and the number of registered physicians, dentists, and nurses in the United States, with a constant seventeen jour-

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nals per 1,000 health professionals [3]. On the other hand, over the past twenty years, the number of journals cited by a typical original article in the New England Journal of Medicine has doubled, from around twenty in 1965 to forty in 1985.

So, demonstrably, it is now harder work to keep up. But there are even more important problems than this, which have vital implications for the future of the whole publishing process. To summarize, we can use that tired hack-word, “dis-ease”—at a number of levels. We do not know precisely the extent of one important aspect—duplicate publication—but it is probably not inconsiderable. One editor of a specialty journal took a sample of 1,000 consecutive authors. Two hundred and one authors produced 443 duplicates, or two each. Only 4% were true duplicates; the rest were “salmi” articles, but in every case the editor had not been told [4].

Many years ago, Warren showed that, of the 10,000 papers published on schistosomiasis between 1850 and 1960, it was the consensus of 50 experts that only 400 papers were any good, and that these 400 were contained in just 16 journals [5]. This has been confirmed more recently by Haynes and the McMaster group, who have shown how poorly journals serve clinicians faced with particular problems at the bedside. They probably have to read 15-16 articles before they find one that gives information about a specific beneficial effect [6].

To look at articles in individual detail is to find just how many of them are seriously flawed scientifically. Much of the work on this has concerned the statistical handling of data. Two early studies showed that almost 73% of analytic studies in each of the ten most frequently read U.S. biomedical journals and over half of sixty-two articles sampled in the British Medical Journal were appreciably flawed from the statistical point of view [7-8]. Many major journals have now added formal statistical appraisal to their peer review system, and this can raise standards appreciably [9]. Even more depressingly, another study of over 4,200 research reports has shown enormous scientific defects elsewhere [10]. These strictures do not apply merely to papers reporting original research; Chalmer has shown that for review articles the rules of science are also often disregarded [11].

HOW PHYSICIANS USE INFORMATION

To look at how physicians actually use the information in journals is to become even more depressed. Haynes has shown that even teaching hospital residents are likely to base their therapy on the title of an article, let alone the abstract, and certainly not the full text [12]. Williamson and his colleagues, who asked groups of physicians about their use of recent important clinical advances, such as measuring hemoglobin AIC as an aid to diabetes control, found that between one fifth to one half of all doctors were not aware of the techniques or were not using them [13].

Solutions have been proposed for these problems, and you have to choose which of two great seventeenth-century philosophers you wish to follow. You can be tough with Thomas Hobbes or relaxed with John Locke; that is to say, you can tighten your peer review and introduce more checklists, or you can rely on a powerful and knowledgeable but tolerant medical editor who will try not to stifle creativity, believing that all will turn out for the best. The Hobbesians would like to separate articles, particularly in the general journals, into “pink pages” by classifying them into basic science reports, clinical studies, and tighter editorials, in the form of meta-analysis. New formats of journals such as Journal Club and Journalwatch have already appeared. When asked about the future of journals, I personally believe that the system will remain a mess. The Western world is far too prosperous and there are far too many vested interests for things to change. Libraries are far too rich and the heads of university clinical departments far too powerful not to get their own way in insisting on what holdings libraries should have. And, so long as society continues to reward its members on the basis of the quantity of work they publish, the continued expansion of journals is not likely to change very much. After all, Price has shown good philosophical grounds for this expansion. Any alternative brings us to the minefield of value judgments on quality. Scientists have to be prepared to say in detail whether or not a paper has value, not only during peer review but also when they are assessing candidates for promotion. All this is very hard work and fraught with problems, and I know of no superior authority likely to insist that standards must really be changed.

JUSTIFIABLE LAISSEZ-FAIRE?

Finally, in general philosophical terms, this laissez-faire point of view may be justifiable. Let us take a biological example. Biological systems are extremely wasteful—wasn’t it Aldous Huxley who wrote

A million million spermatozoa,
All of them alive:
Out of their cataclysm but one poor Noah,
Dare hope to survive.

If you accept this, then the 10% of published articles that have acceptable scientific standards, that end up by being cited, even in standard textbooks and review articles, may not be too bad a proportion.

If I had to prophesy, I would say that in fifty years’ time we might well have 50,000 or more biomedical
journals. Many of the new ones will be necessary for only a small group, but a new journal is still economically viable if only 400 subscribers have to have it. The general journals will introduce yet more review articles and editorial comment, while the specialty journals in the first tier will continue to metamorphose into general journals of the specialty, with an increasing number of review articles, news features, and comment. I suspect that the low standards we talk about will largely persist because there is not a mechanism for insisting that they should be raised.

As to the new technology, I believe that its role will be more limited than has been thought. The response of even computer-literate scientists has been to prefer to wait for a hard copy version of a paper rather than to have instant access to a copy on a screen. To be sure, databases such as Index Medicus and DNA sequences are ideally suited to online systems or CD-ROMs. Anything approaching a journal in such a format raises important questions. What about peer review? How are scientists going to chalk up sufficient visibility and kudos to win the Nobel Prize? And who, besides a drug company interested in a specific problem, is going to pay something like $50 for an article in this sort of format compared with an annual subscription of only $300 for a journal. For print is still incredibly cheap. As Huth has also shown, 1,000 words in a general journal costs a fiftieth of its equivalent on an audiotape and a thousandth of that in a postgraduate course [14]. In the end, market forces are what largely determine the pattern of most things in a free society. And, though at heart I am a repressive Hobbesian idealist and wish to see every statement in every journal at least trustworthy, I cannot see why medical journals should not follow the depressing but realistic trends of the rest of our society.

REFERENCES


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