

Is There a Future For The  
Scientific Journal?\*

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Until now, the scientific journal has demonstrated remarkable staying power. Since the first journal was published in 1665, this particular communications medium has shown a growth rate that is truly astonishing. Professor Derek Price has described this growth, this so-called information explosion in his classic work *Big Science, Little Science*.<sup>1</sup>

But today it is somewhat fashionable to talk about the decline of the scientific journal. Part of the basis for this talk is the skyrocketing costs of publishing operations. In the face of library budgets already so tight that even present demands for journal subscriptions cannot be met, who will be able to afford continued growth of the journal literature? There is also the feeling of most researchers that they are already information-saturated, and they cannot comprehend how they will cope with even one more journal. Added to these factors are the aspirations of the people who offer the new information technologies like microfilm, on-line access, and audio/visual cassettes. If the scientific journal expires, surely the use of these methods to disseminate scientific information will increase.

Despite all these pressures, it is my opinion that the future of the sci-

entific journal is secure for one very simple reason: scientists will continue to write and read scientific papers.

**Continued Needs to Publish**

I can see nothing on the horizon that will take the place of the scientific paper. This is especially true if we define a paper by its intellectual content rather than its physical form.

Surely scientists of the future will have need to record and distribute data generated by experiments. And even though much of this data could be, as is often speculated, input directly to some central information bank, there still remains an enormous amount that will only make sense when supported by narrative text. And certainly coming generations of scientists will want to express their opinions and their conclusions about their particular interests. How else will they be able to communicate at this personal level if not through a personally-authored paper?

There is talk of a kind of communal type of scientific publication where everyone inputs scientific data anonymously and uses it anonymously. If this ever happens, it will be the end of the egocentric fulfillment that the scientist achieves through the act of publication. I don't think this is a reasonable

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possibility since science is not an anonymous process. Peer judgment and praise are critical ingredients in the satisfaction derived by scientists. So, as far as I can see, the review paper is as close to communal data as we are likely to get.

It is thus clear that, in one form or another, scientists will continue to write what must be recognized as scientific papers. How many they write will be tied to the general level of scientific work in progress, which will be subject to short-term peaks and valleys. In the long run, however, I am enough of an optimist to foresee a real increase in the amount of science that the world's decision-makers will support.<sup>2</sup> The implications for humanity of an overall decline in scientific activities are too bleak for me to deal with here.

Given the need for scientists to continue to write and publish papers, I feel there can be little doubt that there will continue to be journals. This is not to say that there won't be a multitude of forces at work to change the way journals are assembled and disseminated, how they are financed, or how specialized they are. But whatever emerges will still be a journal. It's the old story of "a rose by any other name. . ."

Concurrent with the changes in journals will be changes in the ways librarians deal with individual journals and journal collections. In the remainder of this article I have found it convenient to speculate on what will happen to journals and the librarians who work with them in the context of two time frames: the near and the more distant future.

### Short-Term Outlook

For at least the next decade, I believe the *printed* journal will continue to be the main form of scientific publication. Besides the reluctance for scientists in general to give up things that are familiar and comfortable, present publishers, advertisers, printers, and editors have a vested interest in maintaining printed journals. The inertia of government is also a factor that will tend to maintain the status quo. The U.S. Postal System, for instance, defines a journal as something *printed on paper* and would no longer subsidize—through favorable postage rates—the distribution of journals that switch to microfilm. American copyright laws which fail to recognize nonprint information technologies also contribute to the preservation of the printed journal.

While I don't believe the continuation of the journal in *printed form* to be necessarily good or bad, there are some economic considerations that are already having profound effects on existing journals as well as on those journals that are now just ideas.

Without a switch to more cost effective means of publishing than printing, *journals of marginal quality will simply go out of existence* because people won't be able to afford them. No longer will the publishers of bad journals be able to count that "group of libraries that buy everything" to keep their useless publications alive. Faced with static or reduced budgets, librarians will have to become more selective in subscribing to new journals and in continuing

subscriptions to old ones. They'll make more decisions based on what journals are truly useful, not on what journals are allegedly needed to cover a field in its entirety.

Librarians will start to use more objective ways of evaluating the worth of a journal. I see them doing things like counting the interlibrary loan requests or reprint requests they process for a given journal to see how much real use it gets. I also think they'll start to look at things like the audited readership studies made available by some journals that carry advertising. From such studies they'll see if a journal is likely to be read cover-to-cover, just glanced through, or ignored until a specific article is wanted. And journal citation statistics and other special studies available from ISI are already being used as evaluative tools by librarians who must build and manage collections.<sup>3</sup> Happily, one effect of all this quality consciousness will be an upgrading of the average paper that gets published.

I especially see the larger journals faced with some difficulties. As long as paper was cheap and postage low, the large journal made sense. But with the cost of both these items heading out of sight, the economics of publishing a large journal are looking grim.

And it's not only economics working against large journals. An author submitting a paper to this type of journal often has to wait from six months to two years to see it in print. For a scientist with a break-through in a fast-developing field, this delay can mean that the paper will be obsolete by the time it's published.

This explains why so many letters journals have come into being.

The growth of secondary information services like *Current Contents*, *Chemical Titles*, *Physics Titles* and others is an important new factor also affecting large journals. There was a time when chemists felt that unless their papers appeared in a journal of the American Chemical Society, their work would not be known. Today, they can publish in any one of a hundred less-well-known journals and, because of secondary information services, their work will be seen by most people concerned with the subject matter.

These three factors—economics, the need for rapid publication, and the advent of secondary information services—will combine to bring large journals to a point where they will experience little growth but can remain viable if they maintain their quality standards. Simultaneously, there will be a proliferation of new, more specialized journals. Studies have shown that approximately one hundred scientists with the same specialty will publish enough to keep a regularly issued journal well supplied with papers. This situation is almost the scientific equivalent to the *Life* and *Look* situation. These two general circulation publications failed, but many special interest magazines have prospered since. Over-all, journal publishing will still be a growth industry, but the growth rate of the *number of articles published* will decline because the new journals that emerge will be small.

In response to all this, the librarian of the near future will probably subscribe to a combination consisting of

a few of the major multidisciplinary journals, a small core of extremely specialized journals dealing with material relevant to the mission of the organization, and one or more large-scale current awareness services.<sup>4</sup>

To supplement these, there will be a new emphasis on acquiring *relevant papers* in anticipation of user's requests. One aspect of this will require the librarian to identify relevant papers as soon as they are published and have them on hand when needed. Far more special librarians than now do it will therefore have to develop a profile that defines the interests of the organization serviced by their library. Such profiles will then be used as the basis for manual scanning or as the basis for automatic searches through computerized SDI services such as those operated by ISI and other suppliers.

Aside from the need to obtain *current* papers likely to be useful to their organizations, librarians will also start to think more about keeping only relevant papers instead of entire journals in their *back-year collections*. One way they will do this will be by using citation data. Obtaining and storing the most highly cited papers published during the last 10 years in a field of interest is one way of building a back-year collection that not only saves space but is likely to be responsive to user demands.

#### Long-Term Outlook

Based on today's technological possibilities, I can visualize the journals of the future transformed by computerization.

The author will sit at a computer

terminal to type a new "paper" while a variety of software systems deal with the routine problems of manuscript preparation. The final draft—with all corrections inserted and bibliography automatically verified—will be transmitted by telephone lines, aided by satellites, to the journal's editorial office. There, the editor will scan it and, by matching profiles, come up with the three best referees for the paper. A switching system will then transmit the manuscript to the terminals of the referees who will read it on their display screen or have it printed out for more casual reading. Referees' comments and author revisions will be transmitted back and forth through the editor until an acceptable draft is completed.

The editor may then use computer typesetting to create a highly readable, *error-free copy* from which a photo-offset negative is automatically generated. Or the final approved manuscript may be transmitted directly to all readers who have expressed an interest in the subject and on request to others.<sup>5</sup> I can even visualize a day when scientists will hear "published" papers through voice synthesizers as they drive to work.

Despite the sci-fi trappings though, the journal will still be a journal, filling the same functions it does today. It will still be a focal point for new information in a given field. And it will still be under the control of some kind of "editor" who will stimulate needed papers from scientists, set priorities, and coordinate the whole process.

If my picture of the journal's future does hold, where will the spec-

ial librarian fit into it? Like the journal editor, the special librarian will work among input-output devices, since the special library of the future will be delineated by divisions of computer memories instead of walls. And although vast amounts of information will be stored in the computer memories, there will still be a lack of information on a specific topic when needed.

What I'm saying is that with so much information ready to be unleashed by merely touching a few keys on a terminal, it will be even more critical in the future to define just what is needed to satisfy a search. Otherwise, the relevant material will be delivered surrounded by so many irrelevant items that the researcher will have to work harder than ever before to get what he or she needs.

It is clear to me, then, that the role of the special librarian as a communicator will take on added significance. As the person in between the researcher and the store of information, librarians will need to develop better interviewing skills if they are to work effectively. They will also need in-

creased familiarity with computers and their peripheral equipment. This will enable them to transmit properly the messages (questions) they obtain from researchers and to interpret the messages received (answers) back from the computers.

#### Impact on Training

So verbal skills will become increasingly important for librarians, but so will their knowledge of all aspects of information science. Unlike Henry Voos,<sup>6</sup> who sees more "emphasis on subject specialization in the library profession," I think there will be a greater demand for people who are librarians first and foremost who will then be given enough subject area training to be effective.

The people who plan curricula for library students should keep their feelers out for these trends and continuously modify course content to reflect what is happening in the real world. There are also implications in these developments for the experienced librarian, and the more astute leaders of librarians' professional organizations will make sure that appropriate programs for continuing education are available.

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