

What is an electronic journal?

A newly published journal offers a prospect of what may be in store when people are persuaded of the folly of making hard copies so that journals can turn them back again into binary signals.

How is this for an extract from a journal's 'guide to authors'? "We can also process papers formatted with the `{\sc troff}/` system (which is usually provided with `{\sc unix}/`). Our procedure involves source-level machine translation from `{\sc unix}/` to L^AT_EX. To ease this translation, avoid defining your own `{\sc troff}` macros. If possible, also avoid `{\sc eqn}` definitions. Try to use the `{\tt -ms}/` or `{\tt -me}/` macro packages."

Fair play, that is not so much an extract from the 'guide to authors' in the first issue of the journal *Complex Systems*, but the translation of that guide into the formatting code known as L^AT_EX. The editor has had the happy wheeze of providing his guide in the form of a sample paper which he then helpfully turns into code so that authors "who intend to transmit your paper to us electronically" will know how to go about it. Then there is a list of no fewer than nine mailbox numbers, on systems such as Arpanet and Bitnet, with which authors may communicate.

The editor of this remarkable journal, Dr Stephen Wolfram, has been well known as an iconoclast since he walked out of an Oxford undergraduate physics course believing its content to be trivial, signing on instead as a graduate student at the California Institute of Technology. For a time, he was Caltech's favourite son, but, after a dispute about the rights and wrongs of selling a computer program privately, moved a few years ago to the Institute of Advanced Study at Princeton, where he has become the apostle of von Neumann's cellular automata (see *Nature* **311**, 419;1984), played a part in the development of the Connection Machine at Cambridge, Massachusetts, and has now, it appears, formed his own single-journal publishing company (Complex Systems Publications Inc.) as well.

The content of the first issue of *Complex Systems* fully reflects this background: almost all the papers are essays in the craft of cellular automata. Apart from the predictable demonstrations that cellular automata are marvellous ways of generating complicated patterns, there are some neat suggestions such as that of Puhua Guan from the University of Puerto Rico that cellular automata should be splendid ways of generating public key cryptograms (where the rules of encryption can be made public without much risk that intruders will be able to decode

messages) and for representing neurons in the sensory cortex by cellular automata in a way that allows for lateral connections between neurons and feedback between back and front. But the journal will be more interesting when the cellular automata are mixed with a more general discussion of complex problems.

That, however, is almost the least interesting remark to make about the new venture. One obvious and unanswered question is why an editor as committed as Wolfram to the computer as a way of life should have followed two very traditional practices in the design of his new journal — his willingness to accept contributions as typewritten paper, and his publication of the journal as inked paper bound between stout covers (rich red in this case). If that is what Wolfram believes is wise, what chance is there that other journals will go further, let alone as far? Time will tell, but the two traditional features of *Complex Systems* are well chosen. There is an important sense in which the proper use of the process of publication turns on two crucial questions of access. First, and most important, an entity cannot be said to have been published unless all who may wish to have access to its content have had a fair chance to consult it. There is no case for believing that papers circulated in electronic form between people whose computers happen to be connected to a common network can be said to have been published in the true sense. It would be different if publication by electronic network were physically accessible to all potential readers, possible by the payment of a fee.

Much the same is true of the input side. When career prospects often depend on publication in reputable journals, there is obviously an element of injustice in any impediment to any author's submission of what he wants to publish to what he considers the most appropriate places, but that is only a small part of the reason why it would now be premature to insist that all submissions should be electronic. It is even more important that any process that makes journals more accessible to some authors than to others skews the contribution of the scientific community to its literature, by legend its only durable product.

This is why there is persistent European resentment at the page charges levied on authors and their institutions by journals published in the United States, ironically

even when the purpose of a communication is to correct a published error. (The other side of this coin is US resentment at high subscription prices for European journals.) These crucial considerations are too often overlooked, especially by grant-making agencies anxious to encourage the new technology wherever possible. Not that there is no place for computers and their ancillaries in the publication process. Much has and will be done to improve the efficiency with which journals manage their internal affairs; in due course there may even be such improvement that page charges and subscription prices will be reduced. This is all that *Complex Systems* plans, for the time being (but it is surprising that a journal using so much technology internally should not provide optical character recognition for those submitting manuscripts not formatted in L^AT_EX, threatening them with delay instead).

When the circumstances will change is anybody's guess. Much will depend on the pace at which the academic computer networks develop. At present, most laboratories in the United States have access to at least one of three packet-switched communications systems, but other countries tend to have separate national or regional networks, whose connections with the US systems are tenuous at best. And some large parts of the scientific community — the Soviet Union is the obvious example — have no connections at all. Elsewhere, there are no networks. If UNESCO were well-managed, the design of a global communications system would be an admirable goal. By default, as they say in the computer trade, it might be a job for the International Council of Scientific Unions. But until the job is done, the electronic part of the electronic journal will be strictly internal.

Meanwhile, now that Wolfram has emerged as one with a proper sense of tradition (and good sense), perhaps even willing to accept the force of the argument that authors enjoy seeing in print what they have written, there may be a case for his resurrecting another tradition, and calling his new journal after himself. It is only a century ago, after all, that Poggen-dorf was a name to conjure with in the literature of chemistry. In spite of the distinction of the editorial board he has recruited, Wolfram's new journal will have something of the same stamp.

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