A more relevant demonstration of the true costs of a high-quality, all-electronic, peer-reviewed journal should be available in the near future, when such a publication for high-energy particle physics will go on-line (for details, see *Science*, vol. 271, 9 February 1996, p. 767).

Boyce and Dalterio are not wholly familiar with electronic systems already in existence, and their insistence on a labor-intensive infrastructure has blinded them to the possibility of large-scale automation of many mechanical aspects of production and distribution. For example, in the course of inappropriately contrasting the e-print archives operating at Los Alamos National Laboratory with the SLAC-SPIRES title/author preprint database operating at the Stanford Linear Accelerator Center, the authors make the gratuitous statement that "The SLAC system in particular has all the critical components of a full electronic publishing system. . . ." For the record, the SLAC title/author database has been an invaluable resource to high-energy physicists for over two decades; although labor-intensive to update and maintain, it has never provided either for author input of articles or for the electronic archiving and retrieval of author-produced source documents. Nor does the SLAC system produce final postscript versions (or PDF or a variety of other formats that are all automatically produced and cached at Los Alamos for redistribution both directly from here and from formal mirror redistribution sites abroad). Nor has the SLAC system ever had (or pretended to have) either the hardware or programming resources to support the type of operation running at Los Alamos (currently over 70 000 electronic transactions per day, including participation of a large dedicated following of astrophysicists).

Moreover, the system at Los Alamos has a full indexing and retrieval capability, as well as automated hyperlink references within papers, and has become the basis for a full electronic publishing enterprise. The system has a password protection scheme that allows authors to transfer "ownership" to any journal (or equivalent overlay) for the purpose of freezing the submission, stamping a "published" reference, or incorporating errata/addenda (all by author/journal negotiation). Original versions of modified papers are archived, and any intermediate version can be reconstructed from a series of replacements.

The 20 000 pages per year processed by the AAS are already a small volume compared to the 13 000 submissions (totaling many hundreds of thousands of pages) received by the e-print archives at Los Alamos during the year 1995, and the system has increased its rate of growth into 1996.

Boyce and Dalterio are incorrect in stating that "both the Los Alamos and SLAC systems provide delivery of source documents." A cursory examination shows that all of the SLAC links to source documents are to documents stored at Los Alamos.

Evidently the authors have confused an external overlay with a source distribution site. External overlays can, should and will be generated anywhere, but links to sources archived elsewhere do not constitute "delivery of source documents." Such confusion is indicative of Boyce and Dalterio's failure to appreciate fully the large-scale efficiencies of the electronic medium and its attendant author-empowering potentialities.

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BOYCE AND DALTERIO REPLY: We are sorry that Paul Ginsparg has taken such umbrage at our article. Our intention in citing the examples was simply to indicate that preprint servers and bibliographic services are beginning to furnish all of the services that have traditionally been provided by the publishers of paper journals.

We would like to correct some misperceptions that Ginsparg's letter may leave with the reader. The AAS has four years of experience in the electronic submission and delivery of research results, starting with abstracts of meeting presentations and ending with electronic delivery of a full-featured scholarly journal. Having had to support the complete astronomical community, not just those with good Internet connectivity, we fully understand the requirement that we not disenfranchise good researchers who, for whatever reason, may be late in adapting to the revolution in electronic communication. Our experience with the AAS meeting abstracts shows that there must be a period in which parallel paper and electronic systems are operating.

As a professional society with some responsibility for the health of the sciences, the AAS has chosen to make an evolutionary and, we trust, rational transition from paper to electronic communication. This decision holds us to a slower, and admittedly more expensive, transition than if we had adopted Ginsparg's model of self-publishing.

Our electronic *Astrophysical Journal* (eApJ)[1] has a wealth of links throughout the text, links to the referenced literature, convenient handling of graphics, forward referencing and other user-friendly features. We believe our eApJ is a better indication of the future shape of the electronic journal than is provided by most publishers' electronic delivery of printed pages in postscript and PDF format. We also provide the PDF format for printing, but 80% of our readers prefer the HTML version for on-screen browsing.

Finally, it is difficult for us to understand why Ginsparg takes exception to our example in which the SLAC-SPIRES database provides the bibliographic capability and points to the Los Alamos preprint server for delivery. We believe this example of shared responsibility presages the future mode of delivery of scientific information. The Internet makes it possible for diverse institutions to pool their resources, each one contributing in the area it does best, and all sharing the effort and costs easily and efficiently. Researchers want effective delivery of useful and diverse products from a broad range of providers; the physical whereabouts of archived material is of little concern. Our program is moving rapidly in that direction, but we hope there can be cooperation rather than antagonism between the pioneers into these uncharted regions.

Reference

1. Available at http://www.aas.org/ApJ/.

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Referees' Reports + Authors' Replies = *Physical Review R*

The explosion of electronically retrievable information—along with its layers upon layers of resynthesis—creates a unique opportunity for old-fashioned journals such as *Physical Review* and *Physical Review Letters*. Rather than compete with electronic dissemination for speed, these journals should capitalize on a most valuable resource, which only they own and which is now being filed in obscurity: erudite criticism and debate in the form of anonymous referees' reports and authors' replies.

I propose that prominent journals provide what's missing from the information superhighway by publishing these reports and replies.

Of course, such a step will serve to

nucleate healthy debates about new ideas. But it has other virtues. Recently, I was one of two referees who strongly recommended against publication of a paper. Had our reviews been published, the embarrassing publicity generated by the subsequent appearance of flawed work would have been dampened.

Don't be surprised if *Physical Review R* is the most read journal each month.

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UN, ESA Workshops on Space Science Aimed at Developing Nations

Having read with pleasure Roman Jackiw's letter on the first Sinai Meeting on Physics (February, page 11), I would like to inform your readers about an international initiative that focuses on planetary exploration and astronomy and that enables developing countries to benefit from advances made by the world's space-faring nations and to strengthen scientific ties with them.

The initiative is organized under the umbrella of the United Nations in cooperation with the European Space Agency, the Planetary Society and other space research–related organizations. It consists of an ongoing series of regional meetings known as the UN/ESA Workshops on Basic Space Science, which are held at sites around the world about once a year.

The most recent workshop was held in Colombo, Sri Lanka, last January and attracted 74 astronomers and space scientists from 25 countries. It covered such key topics as research and education with small telescopes (those with mirrors less than 1 m in diameter); telescope projects, robotic telescopes and telescope networking; observing binary stars with telescopes of less than 1 m; the quest for the Big Bang and solar neutrinos; and data archiving and astronomical software packages.

One of the workshop highlights was the inauguration of a 45 cm reflector telescope donated to Sri Lanka by Japan as a follow-up to the 1991 workshop. This instrument was intended to be the heart of an astronomical telescope facility on the roof of a new building of the Arthur C. Clarke Centre for Modern Technologies. (Clarke himself, who lives in Sri Lanka, spoke to the workshop attendees on the subject of space travel.) Although designed primarily for photometric observational studies of variable stars, the telescope also allows for the observation of comets and asteroids, as well as the study of studying atmospheric, interplanetary and interstellar phenomena. Accordingly, the workshop featured a full range of presentations on these topics.

One workshop session focused on the status of four projects initiated as follow-ups to the previous workshops, which were held in Bangalore, India (1991); San José, Costa Rica, and Bogotá, Colombia (1992); Lagos, Nigeria (1993); and Cairo, Egypt (1994). Maria Christina Pineda de Carias, director of the astronomical observatory of the National Autonomous University of Honduras, explained that the observatory was now fully operational and taking the lead in developing astronomy in Central America. Sergio Torres of the National University of Colombia gave a progress report on the Galactic Emission Mapping (GEM) Project, a collaborative international effort to establish an astronomical observatory in Colombia. Joseph Sidky Mikhail of Egypt's National Research Institute of Astronomy and Geophysics (NRIAG) and Peter Köhler, a German physicist specializing in telescope engineering, provided an update on the refurbishing of Egypt's 1.88 m Kottamia telescope, the largest telescope in the Middle East (first light was forecast for the first half of 1997). M. A. Mosallam Shaltout of NRIAG discussed a Planetary Society–sponsored project in which a team of Egyptian scientists, in collaboration with American, Russian and European colleagues, has begun work on designing, building and testing a drill for obtaining subsurface samples on Mars as part of the Russian mission to that planet in 1998. In addition, Rolf Schwartz of Germany's Max Planck Institute for Radio Astronomy gave an overview of the research program in radio astronomy being conducted by the institute, which will be the host of the next UN/ESA workshop, scheduled for 9–13 September of this year.

The Colombo workshop concluded with some special presentations and the adoption of a major recommendation. Mario R. Perez of the US presented a study of astronomical software packages, and also explained how to use the World Wide Web to obtain them free of charge. Willem Wamsteker of the ESA gave a presentation on the electronic accessibility of astronomical data archives maintained by the world's space agencies. Finally, the workshop participants recommended that the world's nations cooperate on designing and constructing a World Space Observatory, preferably for the ultraviolet part of the spectrum.

Further information on the UN/ESA workshops—and specifically the upcoming workshop set for Bonn, Germany—is available on the Internet at ftp://ecf.hq.eso.org/pub/un/un-homepage.html.

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Derivatives Trading Again: Finance Pros Take on Physicists

Imagine the reaction of your readers to the appearance in the *Journal of Finance* of an article criticizing the Schrödinger equation on the grounds that it fails to correctly predict the Lamb shift in hydrogen, and, moreover, requires for its application the absurd assumption that a quantum system can be perfectly isolated from its environment. Oh, and by the way, the equation also is the cause of nuclear weapons. Then, after dispensing in a few short sentences with conventional quantum mechanics, the authors mention that they have found a simple and superior alternative theory, which will soon be adopted by physicists as finance professionals provide them with insights.

If you can imagine all that, perhaps you can understand our reaction to the letter to the editor on derivatives trading by Jean-Philippe Bouchaud and Didier Sornette (March, page 15): Great bewilderment as to why you chose to publish it.

Because most readers of PHYSICS TODAY are presumably physicists rather than finance professionals, but may be interested in the subject, allow us to comment on several of the points raised in the letter.

The limitations of the Black–Scholes theory and its extensions are quite familiar to practitioners. For example, the nonnormal distribution of actual asset returns produces the well-known phenomenon of "volatility smiles," the colorful name used by traders for how the distribution affects pricing with the Black–Scholes model. No options trader would remain a trader for long if he or she ignored this market behavior. (Generally, traders don't tend to be the easily anesthetized sort.)

The thorny problems posed by having to deal with the real-world complexities of hedging versus the idealization of continuous frictionless markets have also been intensively studied both by academics and by researchers at the institutions that trade such things as barrier options