etables in the medium-term future."

Among research of interest to Western scientists is Chen's work on the coat protein genes of several plant viruses. Chen's team has 35,000 hectares of transgenic plants, mainly tobacco but also tomato, under cultivation at 11 locations throughout China. His lab has also screened more than 1100 strains of bacteria from throughout China and found several that secrete proteins inhibiting the growth of some plant pathogens such as rice blast, wheat blast, and rice bacteria blight. He plans large-scale field tests of both wheat and rice implanted with genes encoding those proteins.

Extensive field testing of transgenic plants is also being conducted by the Beijing Institute of Microbiology under the Chinese Academy of Sciences. Several tens of thousands of hectares of tobacco, potato, and oilseed rape, all genetically modified for resistance to viral parasites, are now under cultivation in test fields, according to plant geneticist Tian Bo.

Chinese officials say there have been no adverse effects from the widespread field testing of genetically modified organisms, and knowledgeable Western scientists say they have not heard of any problems. Still, there is concern. "Biosafety is a very delicate thing, and there are sometimes dangers that are more long-term, so one must be careful," says Rudolf Casper, head of the Institute of Biochemistry and Plant Virology of the Federal Institution for Biological Research in Braunschweig, Germany, who attended last year's conference in Hainan. Adds Vandebon of the joint biotech center, "It is very easy for us in the West to say China should not meddle recklessly with nature because we have either enough food or enough money to buy it. Still, it is time China begins subscribing to the sort of regulations governing this kind of work elsewhere in the world."

–Ted Plafker

Ted Plafker is a free-lance writer in Beijing.

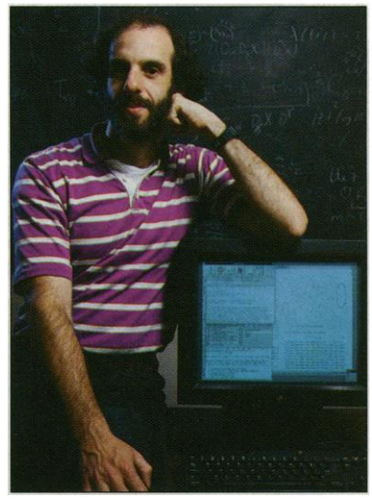
PHYSICS PUBLISHING

Peer Review in Cyberspace

Where do you find the fastest growing physics journal in the world? The answer: http://xxx.lanl.gov/. Three years ago, theoretical physicist Paul Ginsparg created an electronic archive at Los Alamos, accessible at that internet address, to which physicists e-mail preprints and from which they receive the latest work of colleagues and competitors. Since then, the archives have grown almost exponentially. They now include a dozen physics disciplines, plus mathematics, economics, computation, and linguistics, among others; they have more than 20,000 subscribers; and they receive roughly 1000 new preprints a month. Indeed, they have become so indispensable to physicists that they've left many asking whether traditional journals are necesary anymore.

The American Physical Society, which publishes *Physical Review Letters*, among other major journals in the field, has been confronting the same question. Last month the APS, which is planning to publish *Physical Review Letters* electronically starting on 1 July, hosted a meeting at Los Alamos to discuss how its electronic publishing endeavors will fit in with the electronic archives. It was "like the mountain going to Mohammed," says Bob Kelly, director of journal information systems at APS. "The society has become conscious of the fact that if its purpose is to disseminate physics information, we don't have to wait for it to be ink on paper, and it's actually being done a lot earlier, in any case, by the Los Alamos archives, and in some cases, a lot better."

One area in which the traditional journals have had an edge over operations such as the archives is that their papers are peer-reviewed. But even that is likely to change soon: One immediate outcome of the Los Alamos meeting, attended by some 80 physicists, was the development of a plan by Ginsparg and his colleagues to begin peer reviewing submissions to the archives. As Ginsparg describes it, the goal of a system he and nine of his computer-literate colleagues began to flesh out after the Los Alamos meeting is to add more value to peer review than the journals can achieve.



MARK STUCKY

Value added. Ginsparg thinks electronic peer review could outperform traditional journal peer review.

The system, he says, will also have "every imaginable caveat." For starters, reviews will not be anonymous; anyone who wants to criticize a colleague's work will have to attach their name. The system will then likely entail a public scoring system; readers of a paper will give numerical values to the work, assigning separate scores for quality of research, quality of presentation, degree of specialization, etc.

"It will all be completely voluntary," says Ginsparg, "and every author that submits a preprint can say, 'when I submit I don't want to allow any scoring.' " This option, Ginsparg believes, should placate physicists worried that graduate students and postdocs will be afraid to submit to the archives for fear of being devastated by the public response.

Those reading the preprint will also be able to submit comments. To protect the authors from "flame wars"—as devastating personal critiques are called in Internet lingo—the comments will go to authors first, and they can decide whether or not to make the comment public or delete it. The point, says Ginsparg, is to "encourage only positive commentary." But if no comments at all are attached to the paper, says Ginsparg, "there can be only two reasons. Either nobody cared to read it, or nobody cared to comment positively. In either case, it's either wrong or not even wrong, which for our purposes is equivalent."

As for the APS, Michael Turner, a University of Chicago cosmologist who chairs the APS publications oversight committee, says the society is encouraging the experiment with peer review on the electronic archives. These "guerrilla experiments," as Turner calls them, will serve an important purpose for the APS by indicating directions the society itself might eventually take.

These "guerrilla wars" may help instruct the APS in the vagaries of electronic peer review. What the guerrilla publications will not help the APS with is deciding how to charge for their journal electronically. "These young guys," says Turner, "their big motto is 'we're free.' " Right now the APS is considering charging a licensing fee for receiving the journal that will be some percentage of the cost of the print version. "You have to try something," says Turner. "And I'm sure the first thing you try is going to be the wrong thing."

As for the question of why the physics community needs journals anyway, Michael Peskin, a physicist at the Stanford Linear Accelerator Center, put the issue this way: The traditional journals might survive, he says, "because senior people like me think that paper is permanent. However, our younger colleagues do not feel that there is a difference between a page and a disk." And now that peer review may be added to the electronic version of scientific publication, the difference is likely to grow just that much smaller.

–Gary Taubes