Considerations in Creating Online Archives

IN THEIR DISCUSSION OF A PROPOSED ONLINE archive of published science, PubMed Central (PMC), Richard J. Roberts and co-authors and the editors of *Science* raise excellent points (*Science*'s Compass, Viewpoint, 23 Mar., p. 2318). As Editor-in-Chief of *The Journal of Cell Biology* (JCB), I agree with much of what they have to say. Like all of the other academic scientist-editors responsible for running the JCB, I am deeply committed to enhancing the free exchange of scientific information. As a result, the JCB will make all of our back content free after 6 months. Although the material will remain on our servers, it will be posted without any password or entrance controls.

If other publishers took similar steps, the most important goal of Roberts *et al.* could be realized, and without the unavoidable risks that would accompany release of material to multiple servers. We believe that the interests of our authors, readers, and the community at large will be best served by this approach. Efforts would not be duplicated, and the quality of posted material would not be endangered.

Roberts *et al.* say that making existing electronic content available on other servers would be "natural and simple." Those of us involved in the day-to-day practicalities of scientific publishing know that the process is anything but simple. The electronic posting and decoding of scientific text and symbols involve complex parsers that are custom-made for each journal. Every new symbol must be sent to and tagged by each server host, a process prone to error. Thus, hosting content with multiple providers would measurably increase this workload. Biologists may tolerate a certain number of errors (e.g., disappearing statistics symbols), but when "μg" is transformed into "mg" in a medical paper, there is cause for concern. The same considerations apply to the reproduction of complex digital images.

There is no need, however, to risk such a loss of quality control, because duplicating content on PMC is unnecessary. Roberts *et al.* assert that only a single comprehensive collection can be "efficiently indexed, searched, and linked to." This, however, would be akin to AltaVista claiming that they can only index a Web site if the complete content of that site is sent to them and hosted on their server. Clearly, this is not the case. The ability to search across thousands of servers, as long as those servers do not have access controls, is the very reason that the Web is such a powerful tool. I believe that centralization of information is an outmoded concept. Roberts and co-authors argue that a central repository is necessary for full-text searching; this is also incorrect. PubMed is already developing methods for full-text searching of articles on other servers. And finally, PMC duplicates the archiving efforts of entities such as the journal site developed by HighWire Press (a department at Stanford University, in the University Libraries). If such efforts were redirected, PMC would have funds to help develop cross-server search capabilities and to electronically archive older material that as yet has no electronic presence.

"...centralization of information is an outmoded concept."

PubMed Central
access FREE full text articles

"Journals are in that rare position where they can do the right thing and profit at the same time."

I find it difficult to justify spending public funds that might otherwise be available for research and training to underwrite efforts to provide what already exists, especially when what exists is immensely successful. However, at the JBC we believe that a great deal of good can come from PMC if its supporters will abandon the idea of duplicative and error-prone release of content to multiple servers. Instead, they should focus their efforts on ensuring that all journals, both nonprofit and commercial, make their content freely available to those of us who have produced the work in the first place.

IRA MELLMAN
Department of Cell Biology, Ludwig Institute for Cancer Research, Yale University School of Medicine, New Haven, CT 06520–8002, USA. E-mail: ira.mellman@yale.edu

For Free Access, Follow the Brick Red Buttons

TO ADD TO THE DIALOGUE ABOUT AN ONLINE Public Library of Science, I wish to share as Editor-in-Chief of *The Proceedings of the National Academy of Sciences* (PNAS), our experiences with PubMed Central in order to allay some of the concerns expressed by the editors at *Science*. I also offer a compromise position that would expedite formation of a public library while requiring little from publishers.

The National Academy of Sciences is passionately committed to broad access to the scientific literature. PNAS became a charter member of PMC over a year ago, and its content is posted at PMC only 4 weeks after the release of the print edition. This free availability has not caused us any perceptible economic harm. If anything, it has been beneficial. It may seem paradoxical that giving our content away has helped PNAS, but it is an experience shared with other enterprises from pop music and book publishing to radio. The number of people accessing the PNAS online sites at PMC and HighWire Press has continued to grow exponentially during the time we have been associated with PMC. No doubt the brick red button next to PubMed citations to our journal that says "Free in PMC" has provided an incentive for readers to explore PNAS. The increase in accesses to a free journal naturally leads to increased readership, authorship, and even subscriptions. Journals

are in that rare position where they can do the right thing and profit at the same time. PNAS has thrived from giving our content away after 4 weeks, so it is hard to see why other journals fear giving away their content after 6 months or a year.

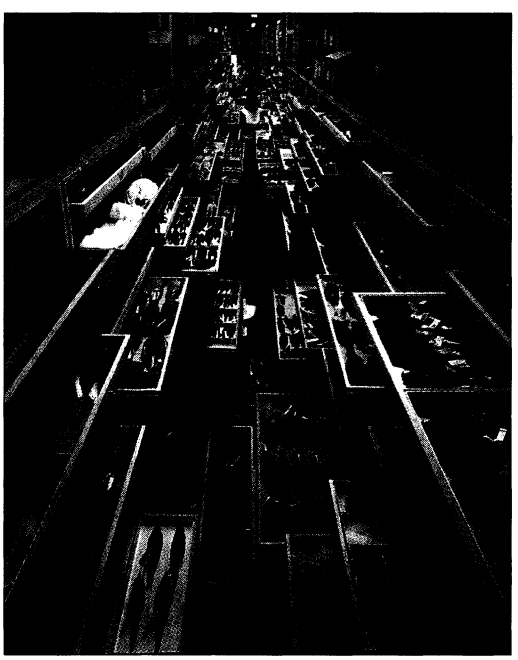
Furthermore, the warning by the *Science* editors about the danger of intrusion by big government into scientific publishing is specious. PMC seeks to be just one of many independent hosts of the scientific archive. PMC is a library, not a publisher. If the National Library of Medicine, with its history of support for biomedical research, were to tell PNAS what we could and could not publish, we would withdraw our content. But the argument is symmetric. If HighWire Press were to institute policies that the National Academy found unacceptable, PNAS would also go elsewhere. The risk in either case is small, but surely having content on two or more sites makes one less vulnerable, not more.

Many publishers are still wary of having their content accessed from a central repository. Thus, at the 21 March meeting of the PMC Advisory Board, an additional means of participation was established that provides an easy transition to full involvement. Journals would, after a delay of preferably up to 6 months but no more than a year, send an electronic form of their content to PMC. An archive would be created allowing full-text searching by all, but not access to the articles. The publisher's site would instead remain as the sole source of their articles as long as they remained freely available. Only if public access were withdrawn would the content be released through PMC. Publishers could thereby determine, in an easily reversible fashion, the consequences of giving their content away and of participating in PMC. This scheme does require a clumsy linking back and forth between sites, unlike full participation in PMC, and it would limit the creative evolution of the process. Nonetheless, I suggest that this intermediate level of involvement in PMC be seen as a good faith effort that removes the threat of the boycott, which would then be focused on the scofflaws who refuse public release. The major beneficiary of this compromise proposal is the scientific public, who would have free access to the literature while the principals work out details in the background. The hope is that the often-confrontational tone of the debate thus far would be replaced by a commitment to a reduction in the delay before free release and the full realization of a Public Library of Science.

NICHOLAS R. COZZARELLI
Department of Molecular and Cell Biology, University of California, Berkeley, CA 94720, USA. E-mail: ncozzare@socrates.berkeley.edu

What's in a PhyloCode Name?

THE CONTROVERSY AMONG TAXONOMISTS about naming and classifying organisms is well summarized by Elizabeth Pennisi in her News Focus article "Taxonomy: Linnaeus's last stand?" (23 Mar., p. 2304). The problem to be solved is not complex, as even Carolus Linnaeus noted in the mid-1770s when he originated the binomial system of naming plants and animals. His intent was to separate the name of a taxon from the description of the taxon—the latter ever changing as new organisms were discovered. In other words, he was offering stability. Ironically, this is the same argument now made by the proponents of the PhyloCode system who claim to have Darwin on their side. The debate is not new.



The proposed PhyloCode system would group organisms in clades based on common ancestors, instead of in ranks based on similarity to a type specimen.

Despite the somewhat rancorous controversy that is portrayed by Pennisi, the Smithsonian Institution (home to advocates on both sides of the debate) is opening the channels of communication between the proponents of the Linnaean system and the PhyloCode system. We believe that the challenge to traditional nomenclature by the PhyloCode is long overdue. However, we also believe that the solution resides not in a replacement of the current Code of Botanical Nomenclature, but in a serious overhaul that takes into consideration modern concepts of evolution and phylogeny.

W. JOHN KRESS, PAULA DEPRIEST
Department of Systematic Biology–Botany, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560–0166, USA. E-mail: kress.john@nmnh.si.edu

Searching for the Heart of Human Nature

"ON THE QUESTION OF HUMAN NATURE, WE need a philosophical fresh start that cannot be provided by genomics alone," concludes Alex Mauron in his Essay "Is the genome the secular equivalent of the soul?" (*Science*'s Compass, 2 Feb., p. 831). I agree with his conclusion, but Mauron does not say how this might be accomplished.

I am one of the few remaining Holocaust survivors, a background that may be seen as a reason for my searches into and publishing on fundamental human concepts and issues. What strikes me most about the questions regarding human nature is that the biological discussions as to an individual inception of personal identity appear to concentrate solely on the stages of development of the concerned matter, not on the mind. By "mind" I mean consciousness.

Correspondingly, the question of when the personal identity of an individual begins—that is, when the existence of an embryo or fetus becomes a moral issue—ought to be focused on the emergence of consciousness, of feeling, the affecting of which and of related matters then becomes a human responsibility. The search for an answer to when consciousness commences is not the easiest, but it is much less involved than the futile quest in biology alone for an answer regarding what is a person. The presence of feeling in organisms is not detected in their carefully scrutinized and detailed structure, but in their overall responses to events. Accordingly, it is a mistake to seek a purely physical explanation for the problem of what constitutes human nature.

PAUL VJECSNER
350 West 51st Street, Number 3D, New York, NY 10019, USA. E-mail: pvj@webtv.net

Response

I FULLY SHARE PAUL VJECSNER'S SKEPTICISM about narrowly focused biological accounts of human nature. I agree that a "philosophical fresh start" will have to take on board issues of consciousness, subjectivity, and feeling, and that these

CREDIT: CHIP CLARK