the NSF encourages promising scientists to study and contribute to education, thus positioning fellows to assist educational reform efforts at all levels. Simultaneously, the industrial sector is providing funding for initiatives that fellows with precisely this training can facilitate (J. Couzin, "A record grant for college programs," News of the Week, 18 Sept., p. 1779). Such opportunities encourage valuable new collaborations among scientists and educators. Current fellows are working cooperatively with teachers and education researchers to develop and rigorously evaluate novel curricula, software, and a variety of learning materials that stimulate critical thinking in diverse classroom settings.

Programs like PFSMETE give scientists the opportunity to create new niches in the academic and private sectors. Although still in its infancy, the PFSMETE program exemplifies the type of initiative that will allow doctoral recipients to adapt to the changing employment environment. We encourage other private and public funding agencies to contribute to these creative efforts.

PFSMETE fellows
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Internet Friendships

The item "Internet hazardous to social health?" (NetWatch, 11 Sept., p. 1567) states that Robert Kraut's work is "[t]he first study of how the Internet affects people's social lives." However, in 1997, we published a paper (*1*) about community involvement and friendship formation among Internet users. In November 1995, we carried out a national random survey of nearly 3000 Americans. Contrary to the pessimistic predictions of numerous scholars and observers, our survey revealed no support for the hypothesis that Internet use is diminishing community participation and social integration. Our study compared users' and non-users' membership in religious, leisure, and community organizations, controlling for demographic differences.

In our paper, we also reported on the results of surveying 601 Internet users about friendship creation through the Internet. Despite ongoing skepticism that the Internet is inimical to meaningful social interactions, we found that a substantial minority of users (14%) had established friendships through the Internet. Of those, three out of five reported meeting one or more of their Internet friends. These results suggest that the Internet is indeed a medium where friendships can be developed.

Our results report attitudes expressed at one point in time. More studies are needed to monitor trends in the impact of the Internet on people's social lives.

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Publishers' Honeymoon?

To Steven Bachrach *et al.*'s recommendation (Policy Forum, *Science*'s Compass, 4 Sept., p. 1459) that a publisher should no longer demand that a scientific author surrender copyright, Floyd E. Bloom (Editorial, 4 Sept., p. 1451) rejoins that, by virtue of a publisher's efforts in editing, proofreading, and distribution, transfer of copyright is not only deserved but "critical to the process of communicating scientific information accurately." The grant to a publisher of substantial auctorial rights is a familiar quid pro quo. The foregoing rejoinder leaps to the stronger conclusion that the grant must be a copyright transfer. Publisher reward for investment, authority to pursue infringers, and a nonexclusive privilege to republish—these and other benefits stressed by Bloom have long flowed by means of authors' licenses, which Bachrach *et al.* do not discuss, of "first serial rights." Manuscript licensing is analogous to a museum's lending items of its collection rather than selling them. An author's freedom to republish has heretofore posed little threat to a first-journal publisher, because competing journals decline works already published. Hence, in foregoing copyright ownership, publishers have lost nothing but permissions fees, a negligible prospect when library holdings and the pace of progress leave little appetite for anthologies.

The Internet has boosted the social val-

ue of scientist-retained copyrights. If authors retain copyright, they may republish on their home pages and elsewhere on the Web. A publisher will not republish a paper absent a profit. Publishers owning but only once exercising copyrights thus impose an opportunity cost equal to the unrealized value of dispersing knowledge more widely. For them, copyright forestalls a practice of quick, cost-free Web republication that could dent any print or Web journal's subscriptions. One could, by the following practice, preserve a competitive edge for refereed journals while still allowing wide dispersal. The agreement by which an author licenses but does not transfer copyright to a publisher could specify a publisher's honeymoon during which the author would forgo republication.

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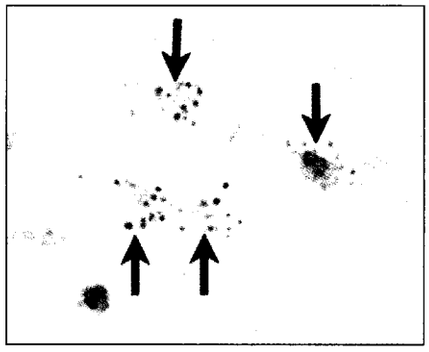
Apoptosis and Alzheimer's Disease

An article by Marcia Barinaga (Special Section, News, 28 Aug., p. 1303) in the recent issue devoted to apoptosis presents the case for apoptotic neuronal death in Alzheimer's disease (AD) based on culture studies and histological analyses. We strongly disagree that this evidence supports widespread apoptosis in AD. Apoptosis requires only 16 to 24 hours for completion and, therefore, in a chronic disease like AD with an average duration of almost 10 years, less than one in about 4000 cells should be undergoing apoptosis at any given time (that is, observation of apoptotic events should be rare) (*1*). Indeed, if all the neurons reported with DNA cleavage were undergoing apoptosis, the brain would rapidly be stripped of neurons. This is certainly not the case in AD.



Do neurons in a brain from an Alzheimer's patient (dotlike staining pattern) indicate cells undergoing apoptosis?

CREDIT: CARL COTMAN, JOSEPH SU, AND CHRISTIAN PIKE

Perhaps the greatest source of misunderstanding is that the criteria used for apoptosis have relied primarily on DNA fragmentation, where even the laddering pattern of fragmentation is not apoptosis-specific because histones protect DNA from a variety of insults, including those of necrosis and oxidative damage. When the more rigorous standard of nuclear condensation is examined, few neurons show apoptosis in AD. In fact, that we can observe neurons displaying many of the features of apoptosis argues that neurons in AD have mounted an effective defense to apoptotic death rather than that they are succumbing. The presence of a wide array of apoptotic markers is more likely indicative of an avoidance of apoptosis rather than actual completion of apoptosis. That neuronal cell death in AD occurs over a lengthy period suggests distinct mechanisms from the classical apoptotic process.

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