Letters

Evolution in High School Texts

George Gaylord Simpson's letter of 7 February (p. 389) alludes to the impact (or lack thereof) that the Biological Sciences Curriculum Study (BSCS) had on the teaching of evolutionary biology in secondary schools.

Ella Thea Smith's contributions to high school biology teaching are so significant as to be beyond dispute. In the first edition of her book *Exploring Biology* (*1*)—a brief, innovative organization of teaching and learning by the basic patterns of life functions—she did indeed identify evolution with the emerging patterns of plant and animal ways of life.

Examination of a later edition, however, suggests an erosion in the treatment of evolution that is difficult to understand as an accommodation to the limitations of space. The fact is that later editions grew regularly larger, which is so often the case in the revision history of a textbook. But by 1959, in an edition of then record length, the text that "discussed evolution fully and correctly" mentioned the word only once. Not until the 1966 edition did evolution resume a position of strength in *Exploring Biology*, and by that time three BSCS textbooks (*2*) had already taken the lead in developing evolutionary biology at the secondary school level, the first commercial editions having been issued in 1963.

I am hard put to understand, therefore, Simpson's comment that a self-serving legend has accompanied that work of the BSCS.

MANERT H. KENNEDY
Biological Sciences Curriculum Study,
Post Office Box 930,
Boulder, Colorado 80302

References

1. E. T. Smith, *Exploring Biology* (Harcourt, Brace, New York, 1938).
2. American Institute of Biological Sciences, Biological Sciences Curriculum Study, *Biological Science: Molecules to Man* (Houghton Mifflin, Boston, 1963); *High School Biology* (Rand McNally, Chicago, 1963); *Biological Sciences: An Inquiry into Life*, D. E. Meyer and V. M. Dryden, Eds. (Harcourt, Brace & World, New York, 1963).

Computer Conferencing

The application of computer conferencing to crisis management, as formulated by Kupperman, Wilcox, and Smith (7 Feb., p. 404), raises some interesting problems of social interaction, in addition to questions about "the nature of the communication interface between man and machine." While many books have been written on man-machine interface, little is known about group communication through a machine.

Over the last 2 years, with support from the National Science Foundation (NSF) Department of Computer Research, our group has conducted over 30 experiments with a family of computer conferencing systems, involving participants in the United States, Canada, Great Britain, and France (*1*). This support has now been extended by the NSF to cover the continued study and assessment of the social and managerial aspects of computer conferencing in selected task environments. We have also developed a system of this type for use by the U.S. Geological Survey in managing data bases and in linking together mineral resource experts.

Some of our experiments have involved social simulations ranging from international standardization conferences to crisis resolution. In these studies, we have monitored the parameters of social interaction by both reactive and nonreactive means (*2*).

Such experience with what must be regarded as a new medium of communication teaches us to be careful in selecting a range of tasks to which computer conferencing can currently be applied with profit. While the medium has proved excellent in many research and management situations and promises to serve as an effective substitute for some business travel, emotion-laden discussions (which arise frequently in international crises) are not so simply amenable to technological solutions. In particular, there is no guarantee that the medium's ability to support a greater information flow than is currently possible in face-to-face, telephone, or TELEX communication cannot be used to confuse rather than to enlighten an adversary.

Clearly, much more experimentation with the social and behavioral aspects of computer conferencing is needed before we entrust our collective safety to this new medium. Kupperman's proposal to start such experimentation with a working conference to deal with the problems of famine is an excellent one, especially if its implementation combines the power of the computer with a careful examination of the attending human factors.

JACQUES VALLEE
HUBERT LIPINSKI
ROBERT JOHANSEN
THADDEUS WILSON
Institute for the Future,
2740 Sand Hill Road,
Menlo Park, California 94025

Notes

1. This computer conferencing system is currently available on an international commercial computer network.
2. The methodology is described in J. Vallee, H. Lipinski, R. H. Miller, *Group Communication through Computers*, vol. 1, *Design and Use of the FORUM System* (Institute for the Future, Menlo Park, Calif., 1974); J. Vallee, R. Johansen, R. Randolph, A. Hastings, *Group Communication through Computers*, vol. 2, *A Study of Social Effects* (Institute for the Future, Menlo Park, Calif., 1974).

Aging and Cell Division

In reviewing cellular theories of senescence (Research News, 20 Dec. 1974, p. 1105), Jean L. Marx emphasizes ideas and observations based on the notion that the dying out of diploid human cells after about 50 doublings in vitro, as described by Hayflick, represents a legitimate model of animal aging or of a significant age-related process in an animal. Data disputing this notion were not included.

A great deal is known about cell populations in aging animals. Cell proliferation in regenerating liver is similar in rats 4 to 8 and 20 to 31 months old (*1*). The generation time of intestinal cells of very old mice is only slightly lengthened, and there is no dying out of this population (*2*). Marrow erythrocyte precursors from moribund, aged mice were as effective as cells from young mice in curing genetically anemic mice and, on serial transfer, were surviving and proliferating 13 months beyond the original donor's life-span (*3*). Serially transplanted mouse skin has been reported