Letters

A Sequence for Biology Studies

As another parent of two children who have had high school biology (both had the Biological Sciences Curriculum Study Blue Version course), I would like to comment on Branson's letter (28 Oct.). My children have both come away, instilled with enthusiasm for the study of biology, with the feeling that it's a science, that it's understandable, and that it has principles. I feel that the BSCS Blue Version high school course is a great advance over its predecessors, precisely because it is so intellectually interesting and stimulating. It teaches the excitement of modern biology. It cannot, of course, teach all of the facts. No course can. The most that a high school biology course can do is to awaken the student's interest, and thence to help him to want to learn for himself other related biological matters.

I do not feel either that my children have been shortchanged by the BSCS Blue Version course, because they didn't learn about the difference between "beetles and crickets." They luckily already knew the difference because they had learned this kind of biology in elementary school, which is probably a good place to start learning it. In Pasadena, at least, the introduction to natural history forms an important part of the elementary school education, when children are of an age and disposition which makes them natural collectors and classifiers. I would hope that in the future, as our education becomes more organized and systematized, children in general would learn about natural history, about the wonderful variety of plants and animals, about their ecologies, anatomies, and taxonomies, in the elementary schools, and that by the time they reach high school they will not only have been prepared for learning the excitement of biology as a science from the Blue Version BSCS, or its successor, but will be able to do so with a sound foundation in basic classical biology gained at a younger age. Branson and I are asking for the same thing. We merely differ as to the time in a child's life at which the two kinds of biology should be taught. She says teach the classic biology in high school; and molecular biology, if ever, later. I say teach classic biology in elementary school and molecular biology in high school, or perhaps, in years to come, in junior high school.

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The Lean and Hungry Effort

Like Bok (Letters, 4 Nov.), I am surprised at the lack of real drive, the "lean and hungry" effort, which used to be so characteristic of all doctoral candidates. After being out of academic life for over a decade, I recently spent 2 weeks on the campus of a highly respected state university, in the top 20 of those receiving government research funds, and observed the entire spectrum of its research activities. I made a special effort to talk to graduate students. Although the sample was limited, generalizations quickly emerged. Many had families, quite comfortable campus living quarters, and no great urgency to finish up and move on. Another characteristic was the general heavy reliance on sophisticated equipment. Whether psychologists or organic chemists, they all knew far more about electronics than I had ever thought of learning, and could trouble shoot and fix their equipment. But as a corollary, few seemed inclined to do anything without the aid of a desk calculator, or a bank of recorders, or automatic fraction collectors.

The biggest surprise was the graduate student's attitude toward his stipend. The presumption seemed quite general that as long as a man worked reasonably diligently and competently (at no matter what), it was his right to be properly supported. Undoubtedly the gap between the student and the ultimate source of his support—the taxpayer—is great enough today to dilute feelings of responsibility to any specific employer in terms of doing an important job, of doing it well, and of doing it efficiently.

Bok notes that it used to be a real privilege to be admitted to graduate school and to be awarded a fellowship. Today admission is probably still a major accomplishment, but once there, the average student seems to become awfully complacent. It disturbs me.

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UFO's and Leprechauns

There will be, as Hynek notes (21 Oct.) a 21st-century science. There will be orbiting laboratories with more advanced technology than we have today. Atmospheric phenomena which are not now identifiable will be identified. Meanwhile, ought not physical and social scientists, continually and constantly (i) to exhort people to have patience, and (ii) to remind them that, up to the present, UFO's have furnished no evidence of extraterrestrial intellectual beings, and (iii) to point out that the existence of extraterrestrial little green men is no more firmly established than that of leprechauns?

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. . . The earliest UFO I have heard of was in 1800, by the very stable and reliable scientist, William Dunbar of Mississippi. It was in the form of a *house*. The full written details are given in *Life, Letters and Papers of William Dunbar, 1749–1810* [D. Rowland, Ed. (Mississippi Historical Society, 1930), pp. 104–105]. It is completely unexplained.

Apparently houses are a 19th-century image and saucers are a 20th-century image. I think this is work for the psychologist, not the physicist. That there may have been something back of the images, I readily admit. However, an object that hovers or wobbles in the vision, then shoots upward at a great rate of speed, sounds to me like a reflex of the eye to a stimulus, not an objective description of the stimulus itself.

Since William Dunbar had square UFO's, and we have round ones, the

next step would seem to be triangles. If NASA would only make our spacecraft a little more pointy, this being well within the range of 20th-century science; we may not have to wait for the 21st century.

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Project Hindsight: Basic Research

There is a significant reason for the apparently small contribution made by basic research toward the development of new military weapons as reported in the Project Hindsight study (News and Comment, 18 Nov., p. 872). The fact is that the points of impact of the basic ideas with the beginnings of weaponry development were not included as "Events" for the stated reason that they were too difficult to identify. The ideas behind design and development were ideas that were born in the educational process or in specialized study —not found in recorded conversations and correspondence. There was no attempt to denigrate the role of basic research, but some end point had to be set in conducting the study.

It would be disturbing, therefore, if the Department of Defense should reach the conclusion from Hindsight that basic research is worth little support. One could map the Mississippi northward to Memphis and, from this, conclude that the Ohio River made no contribution to the flow.

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Electronic Network in Hospitals

The article by Miller on EDUCOM (28 Oct, p. 483) states that "a national electronic network for transmitting hospital records is now feasible." This statement seems to be based, at least in part, on the experiences at the Massachusetts General Hospital with the Hospital Computer Project.

The unwary reader may make the erroneous inference that we have a program at the MGH that is capable of operational participation in such a network. The problems of using a computer to collect and process the information in the medical record are complex, and the techniques we have evolved in our Laboratory of Computer Science are, in many ways, primitive and inadequate for a total system. There is still considerable developmental effort required in the areas of computer technology and terminal utilization and especially in our understanding and formularization of the problems and methods of solution. Any network capable of functioning in the next few years would contain only very limited patient information, and certainly not the total hospital record.

Miller is certainly correct in his thesis that a computer network for transmitting patient care information from one hospital to another is a desirable feature, not only to facilitate improved patient care in a mobile urban society, but also to make possible medical research on a large population. However, a network is only feasible when there are viable units, and this latter objective has not yet been realized. The significant problems concern the nature of medical practice and the characteristics of individual hospitals; once these are solved, the network problems should not present severe barriers.

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The Measure of Good Teaching

With respect to the discussion concerning Warren Weaver's editorial, "Good teaching" (Letters, 19 Aug.), it seems to me that, in the simplest essence, the good teacher has to fulfill two independent roles. He has to communicate to his students the contents of the particular subject matter field that he is teaching. Since it is to students that he is communicating, it follows that the students should judge the effectiveness of his communication. This, I believe, is what is really measured by various tests of students' opinions of teachers. That is, they are judging the instructor with respect to whether he is telling them something in an interesting, enthusiastic, and dedicated fashion.

Students, of course, are not able to judge whether the instructor is giving the appropriate content information. An instructor may be just as enthusiastic and dedicated in imparting disproven facts as in describing new and current