Letters

Philanthropy

The letter of P. W. Hutson [*Science* **129**, 1369 (1959)], condemning the editorial which suggested increased philanthropy and argued its advantages from the federal income tax viewpoint, is amazing indeed.

Granted that private philanthropy may be irresponsible and wasteful, so may our tax-supported philanthropy. But while the private philanthropist possesses direct control over the uses of his gifts, the taxpayer can stop paying otherwise compulsory taxes only by becoming a private philanthropist. Thus, the use of permissible deductions, plus expressions of opinion to his elected representatives, constitute the only indirect controls available to the taxpayer over the ultimate uses to which his tax monies will be put.

I disapprove of vast federal expenditures to enable us to send Mr. Smith to the moon and blow his family to smithereens while he is gone, and I take advantage of every legal provision available to reduce my federal income taxes. This is possible because of the deductions and exemptions permitted, and I intend to continue to give till it hurts.

It doesn't hurt, really, and it probably does much more good for all of us than sending anyone to the moon ever will. I urge my fellow scientists and citizens to do much more of the same.

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Science Teaching

Since the advent of the first Russian sputnik, Americans have indulged themselves in some very tardy, and much-needed, criticism of their educational system. Much has been found wanting, many ideas have been discussed, but very little has been done to alleviate the crucial deficiencies thus brought to light.

To judge from personal experience at three different collegiate establishments, the greatest impediment to the improvement of college courses in biology and botany seems to be a dogmatic and narrow-minded view of heads and chairmen of departments as to what such courses should include and how they should be taught.

What I am saying is that the "academic dry-rot," so well described by William Morton Wheeler several decades ago, in the meantime has decayed the structure of our educational system so thoroughly that the system collapses almost of its own weight under the continued onslaught of the specialists whose minds are sharp as razor blades and just about as broad.

Elementary courses are still taught as if the majority of students were to be science majors rather than citizens of a democracy. In contradiction to the essence of science, there is an abhorrence to experimentation, presumably on the assumption that Louis Agassiz and Asa Gray knew all there is to know of college teaching.

Within this adolescent frame of reference, course improvement means "cramming" the lecture with more subject matter and the laboratory with more experiments that repeat the material of the lecture, at the same time restricting the entire scope of the course to plodding through the textbook.

According to this pedagogical outlook, lecturing in an elementary course is delegated to the newest and least capable member of the faculty, and the laboratory sections are handed over to well-meaning graduate students whose only qualification for teaching is that they are promising candidates for the Ph.D.

Apparently, the practical implications of general education, as well as the dire need for all citizens of a democracy to have a general knowledge of science at this time, are still not recognized by the great majority of biologists in general, and by those in charge of instruction of elementary courses in particular. And in fact, among the orthodox, the instructors of courses in general education are automatically relegated to an inferior status in the academic hierarchy.

I do not doubt that there are intelligent heads or chairmen of departments of biology and botany to be found, but in 9 years of searching I have encountered only one who had the guts to advocate an elementary course which was frankly experimental and openly oriented to general education. Nowhere, it seems, is the spirit of science so dead as in elementary biology and botany courses.

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The growing pressure from our government to improve and extend science teaching in the high schools has raised serious questions concerning the best ways to attract and hold the interest of high-school students with respect to science.

The common method has been either to specialize—that is, give courses in physics, chemistry, and so on—or to give science survey courses that offer a little bit of each science. Would it be feasible to teach high-school science in terms of a *connected theme* of common interest that would serve to link in a meaningful way the various areas of the sciences (and mathematics)?

During the summer of 1959, at the University of Oklahoma, I will be engaged in a National Science Foundation program for high-school science teachers. The National Science Foundation course (which is one of several to be offered at the university at that time) is on cosmogony and evolution. It deals with the scientific theories of the origin and development of an expanding physical universe; the appearance of the basic "particles" (hyperons, protons, electrons, and so on); the emergence of atoms, molecules, and extragalactic nebulae; the stars and the planetary systems; the formation of the earth; and the emergence and evolution of life. In the course of this project we shall discuss scientific method and shall present the astronomical, physical, chemical, geological, biochemical, and biological details in such a way as to tie them in meaningfully with the history of the universe and of our earth.

We feel that among young people are many who may be readily motivated by the questions: "How did it all begin?" "How did the stars come to be?" "Where did the earth come from?" "Where and how did life arise?" With such a central theme, it becomes reasonable to hope that the technical and often boring details of mathematics and the specialized natural sciences will become more significant and interesting to the high-school student; the parts of knowledge will be acquired within a meaningful whole that should be more ego-involving for the student.

We have selected about 35 high-school science teachers, both men and women, from all parts of the nation (the majority are from Oklahoma) and ranging in age from the mid-20's to the early 50's.

We shall utilize the help of an astronomer, a biochemist, and a geneticist. The institute will be given jointly by David Kitts, a geologist-paleontologist, and by me (a philosopher of science and physicist). We have had consultation with Sidney Fox of Florida State University on the chemical origins of life, and we plan to demonstrate (ultimately for high-school science-teaching purposes) the emergence of amino acids and so on under conditions simulating the supposed natural conditions on earth prior to the origin of simple life forms.

We shall utilize all available audio-visual aids, including Atomic Energy Commission materials on atomic and nuclear theories, and astronomical observatory facilities, laboratory demonstrations, and scientific charts and literature on relevant subjects. Our high-school teachers will help us work out the best ways of implementing our program in the high schools. Obviously, we are going to need a great deal of help from the high-school administrators, and perhaps from government agencies, if this program is eventually to be deemed valuable enough to be introduced into the high-school teaching system.

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Flycatchers and Warblers

In the legend to Fig. 4 of D. J. Struik's interesting historical article [*Science* **129**, 1103 (1959)], illustrations 2, 3, and 4 on the plate reproduced from Alexander Wilson's *American Ornithology* are described as "flycatchers." It is true that Wilson listed these birds in the genus *Muscicapa,* but this name is now confined to the flycatchers of the Old World. The birds portrayed on Wilson's plate 26 are members of the New World family Parulidae, the wood warblers. Their resemblance to the true flycatchers is superficial and has resulted from convergent adaptations to the flycatching habit.

It may be of interest to note that the three warblers shown on this plate are members of a genus named *Wilsonia,* in honor of the artist, by the great 19th-century ornithologist Prince Charles Lucien Bonaparte, nephew of Napoleon I. Illustration 4 on the plate is *Wilsonia pusilla* (Wilson), commonly called Wilson's warbler.

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I am grateful to Parkes for his correction, which will be helpful to all who have wondered what kind of "flycatchers" were represented in Fig. 4 of my article.

It may also interest shell collectors to know that the *Fusus corneus* of Fig. 2 is now called *Colus stimpsoni* (Mörch) and the *Fusus cinereus, Urosalpinx cinerea* (Say), for which information I have to thank W. J. Clench of Harvard University.

I also received a letter from Thomson King, director of the Enoch Pratt Free Library of Baltimore, Maryland, who objected to my expression "Robert Fulton's inventions" for the successes of the steamboat; he stressed the merits of James Rumney and James Fitch and concluded with "It is rather ironical that Fulton actually invented and gave a demonstration for the English Admiralty of a submarine, hand driven. Now thousands of people believe he invented the steamboat and apparently no one knows that he really did invent the submarine."

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