Letters

Ages of Experimental Animals

I was agreeably impressed by Calloway's suggestion (31 Dec., p. 1771) that experimental animals should be of known ages and of different ages. Inspired to follow further his ideal of exponentially related ages, I have been planning experiments. Starting with an animal of unit age 1 year, A, I added animals, as specified by Calloway, of ages "A^2, A^3, A^4, and so on," but to my distress all seemed to be of the same ages. So I tried an animal of unit age 1/2 year, and found that my other animals were aged 1/4 year, 1/8 year, 1/16 year, and so on. This did not seem quite right, so I decided to specify my ½-year-old as aged 182½ days. Then I found that my second animal would be aged over 90 years, which seemed to limit the choice of species. It turned out that my fourth animal should be something over 3 million years old, and this is too much to cope with even for a paleontologist.

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Education: The European System

I take exception to James Brian Quinn's statement ("National planning of science and technology in France," 19 Nov., p. 993) about what he refers to as "anachronistic rigidities" in the French educational system. [Quinn wrote, "Once started on an educational 'track' in childhood, a person finds it almost impossible to change to another. . . . Thus many 'late bloomers' and people who want to change careers are lost to science, engineering, and other professions."]

Having been educated in the primary, secondary, and university system of Western Europe, I believe that there are a number of advantages to the so-called track system that begins during early schooling. To understand why it is possible to make a choice between a humanistic and a science track before entering high school, one must know what the curriculum consists of before this decision is made. In the European system that I am familiar with, each student has seven or eight 45-minute periods a day. These include native language and literature, mathematics, biology, chemistry, physics, history, in short, the entire spectrum, which all students are required to take. Every year or second year a foreign language is added. Thus a student has all through grade school at least four hours each week of each subject. Before entering high school a decision is made by the student, in consultation with his parents and teachers, whether to enter a humanistically oriented (gymnasium) or a science-oriented high school. The decision is not difficult. Since he has already had nine years of history, languages, mathematics, and the natural and physical sciences, it has become quite evident where his talent lies and where his interests are strongest. Once he enters the type of high school he prefers, he still continues with some subjects of the alternate curriculum, but the stress is on his chosen general area.

Thus when one enters the university at 18 years of age to study medicine, for example, one has had the following training: 11 years of biology, mathematics (including calculus and differential equations), physics, chemistry (organic, inorganic, and analytical), geography, and study of one's native language; 9 or 10 years each of three other modern languages; 3 years each of Latin and Greek; approximately 5 years each of philosophy, history, art, industrial arts or home economics; and so forth. In the university one immediately embarks on a comprehensive preclinical curriculum of five semesters followed by six semesters of clinical studies. The advantage is that one graduates from the university at 24 and earns a medical degree, which includes a lengthy thesis and oral examination, at 25 years of age. One is ready then to hang out one's shingle as a general practitioner. To become a specialist in a chosen area requires four more years of research and clinical activities.

I doubt that the free choice of subjects during the early years of schooling has given students in the United States a greater knowledge of languages or the sciences in a shorter period of time or, as a matter of fact, in any amount of time. There is some doubt in my mind that a student who has shown little or no inclination for or ability in the sciences in 9 years will suddenly feel a "calling" for a scientific career. A more intensive curriculum, which includes various subjects for long periods of time (instead of 2 years of French or mathematics, for example), will prepare the student better for an earlier decision as to his direction and will give him a more solid basis of knowledge for whatever he may choose as his life career. It is my belief that the number of years and the cost of higher education in the United States could be cut considerably if the lower schools put less emphasis on options and more on a solid academic education.

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Scientific Manpower Commission and the Draft

Elinor Langer's article "Viet-Nam: Growing War and Campus Protests Threaten Student Deferments" (News and Comment, 17 Dec., p. 1567) presents a misleading picture of the policy of the Scientific Manpower Commission in helping to obtain student deferments, and implies erroneously that the SMC, in implementing that policy, has much in common with activist student groups.

The Selective Service defers full-time students in good standing in the belief that education is a process necessary to the development of personnel for the many demands of our complex society. This procedure is an attempt to utilize the most important resource of the nation in the most effective way possible. The Scientific Manpower Commission subscribes to this belief; makes every effort to see that the regulations for student deferment and the reasons behind those regulations are known to students and universities; and attempts to help individual students or their universities in seeking review of classifica-

tion when such classification seems not to be in accord with policy and procedure.

The commission also believes that many highly trained individuals can serve more effectively in a civilian status than in uniform. It does not advocate the blanket deferment of all students, or of all scientists and engineers without regard to their individual effectiveness in their roles.

Langer speaks of a "somewhat unwitting alliance between the student protestors . . . and the manpower specialists." She says that both groups "have a concept of what amounts to an extended definition of 'alternative service'." What she neglects to stress is that the SMC is concerned with maintaining the supply of highly trained manpower essential to the nation in both war and peace. This is basic in the SMC's policy, whereas it is a matter of no concern to the "student activists."

Langer says, "The activist students and the Scientific Manpower Commission have another thing in common, and that is their methods." The leadership of Students for a Democratic Society, she then reports, proposed an "overt antidraft campaign" which was vetoed by the members, with the result that "the majority of students will continue trying to avoid the draft by methods that run from simply staying in school, to developing asthma, to hinting darkly about suicidal or homosexual tendencies." Some readers have taken this listing to represent the methods that the student activists and the SMC have "in common." It needs to be made perfectly clear, therefore, that the SMC has never proposed any antidraft campaign, overt or otherwise, and does not approve draft dodging in any form.

Draft dodgers, like citizens who fail to pay their taxes, are asking for the rights of citizenship without assuming its concomitant responsibilities. SMC does advocate a fully informed citizenry; a selective (rather than a lottery) process of choosing men to serve in the armed forces when all males are not needed within specified age groups; and those policies of the Selective Service which recognize that without the consistent addition of highly trained manpower to an army of skilled professionals already at work, the nation's army in uniform cannot function effectively.

Local boards and appeal boards of the Selective Service system must make the final decision regarding how each individual registrant should be asked to serve, but they should not be forced to make this decision with incomplete information; nor should individual registrants be refused opportunity to request further consideration of the action of their local boards when they believe their classification does not implement this policy.

Appeal boards and state advisory boards for scientists, engineers, and other technical personnel have been set up to provide registrants, universities, and employers with an opportunity to appeal a classification. If this machinery is to be effective, every citizen should understand the reason behind the deferment policies; and every registrant should be aware both of his obligations and his rights.

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Junior Astronomy Club

The Schools Lectures at the Royal Institution described by Lawrence Bragg (10 Dec. 1965, p. 1420) are similar in a general way to many excellent out-of-school science activities now well established in the United States, such as the programs for young people at the New York Academy of Sciences, the American Museum of Natural History, Columbia University, and the Franklin Institute, to mention only a few.

For 36 years the Junior Astronomy Club, currently at New York University, has sponsored a monthly lecture series during the academic year, with outstanding speakers from the fields of astronomy, physics, and space sciences. Tickets are distributed to junior high schools in New York City, and admission is free to the general public. The free lecture series is only a part of the club's program, which includes Saturday classes in astronomy, observing sessions, publication of the *Junior Astronomy News*, and field trips throughout the academic year.

The one unique feature of our club is that its entire program is conceived, organized, and carried out by the members (ages 12 to 20) without adult direction.

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