# Letters

## Mars and the Evolution of Life

There is considerable feeling among some biologists (and others, as well), as expressed in Wilber's letter (9 July, p. 135), against the large expenditures being made for a quest for life on Mars—sums which might otherwise be allocated to terrestrial research projects.

As a biological scientist without vested interest in the space program, I should like to say something in defense of this quest. While no reasonable scientist can dispute the abundance of challenging problems still awaiting solution on this planet, the intellectual significance of discovering the independent origin of life at a second location in the universe is immeasurable. It would with one stroke eliminate almost all doubt that life is a common rather than unique phenomenon in the cosmos. Without even alluding to the practical benefits which might accrue from such a finding, it would surely represent one of the (if not *the*) most monumental developments in the history of mankind.

While Mars now appears an unlikely culture medium for the origin of life, conditions at its surface were not always what they are today. From what we know of planetary atmospheres, there is every reason to believe that the atmosphere of Mars was at one time more abundant and probably reducing, suitable for the synthesis of organic compounds as in the experiments of Miller and Urey. Mars is much less massive than the earth and consequently may have evolved to its present condition more rapidly. However, through the process of natural selection, life which arose in much more hospitable circumstances may well have evolved to forms which can survive and reproduce even in the rigorous climate there today. Indeed, some terrestrial organisms have been shown to be capable of both survival and modest replication in simulated Martian environments as we best understand them.

It is my conviction, therefore, that the possible return from this project is well worth the chips which have been thrown into the pot.

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## Worms Today, Scientists Tomorrow

I read in the annual report of the National Institute of Mental Health where some behaviorist fellows have trained flatworms and then cut them up and fed them to untrained flatworms who acquired some of the learning through ingestion.

For their own protection scientists must organize and bring this kind of research to a halt. Just imagine the restaurants of the future with signs in the window reading "We serve only the most learned scientists" or "With our Blue Plate luncheon we issue a doctor's degree in three different disciplines."

I would like to make it a matter of public record that I ain't no scholar, I ain't no scientist, and I ain't never learnt nothin' no time no how.

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## The Research Parasite

While I agree with the general philosophy of H. W. Davenport's letter on the research parasite in the university (21 May, p. 1040), I think he has described only half of the syndrome and has incorrectly identified the pathogen. Davenport suggests that it is "a new generation of faculty members, nursed on NIH-NSF support, which regards its own research productivity as its only valid contribution to society." On the basis of my own experience, 5 years on the faculty of a physiology (and biopolitics) department in a midwestern university only a few hundred miles from his institution, I draw a different conclusion.

I believe that there is a positive, not a negative, correlation between teaching and research; the two activities assist each other—and teaching at a graduate level is (or should be) largely an introduction to research. Furthermore, more often than not the good researcher is a stimulating teacher. The difficulty is that the drive by university administrations for prestige has occurred at the same time as the exponential growth of many fields; few individuals can really evaluate their colleagues' research. If the value of Gibbs's and Mendel's publications was largely missed by their contemporaries a century ago, what now with the "information explosion"? Rather than quality, university administrators have turned to quantity—the number of papers published per year, the size of research grants, and so forth. Thus *apparent* research activity has become the principal aim.

The result is that within a university department there may be created an inner circle of "operators" and opportunists, many of whom will not be scholars, who determine general policy and philosophy. The resulting decrease in quality of teaching has been emphasized lately; less frequently mentioned but equally objectionable is the tendency of such "operators" to use graduate students and younger faculty members. The result is that the independent student, who is usually the most capable, is selected against more strongly than the incompetent student; the need for teaching assistants and research assistants (somebody has to do the work) is such that the Ph.D. is awarded for "services rendered." Both student and staff learn their lesson well—teaching (and scholarship) does not pay.

It is not the "new generation of faculty members" who are responsible for this state of affairs. Even if the young staff member wishes to become "Operator, Jr. Grade," the "new generation" does not have the necessary access to the university corridors of power. Nor is the nursing on NIH–NSF support, to paraphrase Davenport, responsible. Some of the problems are intrinsic to the general organization and basic philosophy of the megauniversity and antedate the creation of the various granting agencies.

Department heads will need to do more than just refuse to have NIH career fellows in order to ameliorate university teaching and attitudes. Some suggestions are:

1) University salary scales and promotion policies must reward good teaching.

2) Teaching involves more than lecturing. Introduction of graduate (and some undergraduate) students to modern research methods and thought is no less important, and generally it is better done in the laboratory or the seminar room than in the lecture hall.

3) The position and function of the graduate student must be reevaluated. It is largely through the graduate student that current attitudes and abuses will be transmitted to future generations. One way to minimize the manipulation of students would be to adopt the external examiner system, so successfully used at many universities throughout the world, to insure a reasonable standard of performance, and to adopt a rule that dissertation research is published only under the name of the student who did the research.

The real research parasite in the university is the individual who feeds on the research of others who are under him. At least if he has a career award he will have more time to do some of his own research.

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## Population Control in Man

Judging by Wynne-Edwards's conclusions ("Self-regulating systems in populations of animals," 26 Mar., p. 1543) and by subsequent letters (14 May, p. 892; 25 June, p. 1669), the greatest interest in population-control mechanisms is their identification in human society. Many of the mechanisms of control in primitive man mentioned by Wynne-Edwards (for example, human sacrifice and deliberate impairment of fertility) appear to be tied in with rituals which had no feedback mechanism—that is, they would continue to operate with the same intensity regardless of whether the population were declining or increasing. Without feedback, such mechanisms cannot be biologically useful. Other factors mentioned, such as "social interaction"—conventional competition, communication, and organization—appear to be peripheral and relatively minor and ineffective as population controls in human society.

Historically, populations of man appear to have been controlled largely by famine, pestilence, and war. Each of these has a built-in feedback mechanism. Famine does not occur when population density is low; pestilence spreads slowly when population density (and resultant social contacts) is low, but rapidly and through a higher percentage of the population when population density is high. In primitive times, war appears to have been waged largely by one tribe against neighboring tribes as a means of expanding (or defending) its hunting or agricultural territory. In primitive times, therefore, war as a population control may be regarded as analogous to fights which occur between songbirds, each trying to establish (or defend) its own "territory." The winning tribe, with its newly won resources, could expand; the losing tribe was killed, enslaved, or driven to less hospitable territory. As tribal units have grown into nations, and as technology has increased the population-supporting potential of most land areas, war has taken on new meaning—it has been waged just as much for ideological reasons as for the acquisition of resources for living.

Modern civilization has largely conquered pestilence. Moral and ethical development has made modern nations more likely to help their neighbors in adversity than to prey on them; war as a method of population control now seems intolerable—especially since it has the potential of destroying civilization itself. Of the three great historical population controls, only famine remains unaltered. Since the recent revolutions in industry and agriculture, the specter of famine has grown dim; it has not disappeared but has been pushed by technology out of sight around a curve in the road ahead. We may yet push famine a little farther beyond the curve, but the world's population appears to be approaching that curve at high speed. Is man to revive war as a means of population control? Or is he destined for a brutal encounter with famine?

Gibson's observation (Letters, 14 May, p. 892) that the rate of population growth of several nations was declining before World War II gives us hope that there is an alternative. Gibson points out that the controls were social—"late marriages and small families were fashionable." He neglects to point out that knowledge of contraceptive methods made this type of social control possible. Among populations that have little knowledge of contraception (for example, India and China), social controls are largely ineffective. Such populations, even now, are limited primarily by pestilence and famine.

Can man use his intelligence and rationality to avoid war and famine by making social control of the world's human population a reality? Or are his collective actions so circumscribed by ignorance, lack of understanding between nations, religious taboos, or blind faith that a loving God will provide, that there is no real alternative to war and famine?

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## Metric System

The recent announcement of the British government's decision to abandon the English system of measurements and adopt the metric system should arouse serious thought among American scientists. The admission by the British that their own long-cherished system of weights and measurements is inefficient and unsuited to modern progress and world economy should make Americans consider whether they are going to be the last to hang onto a system of wholly incompatible units, each divided into fractions without common denominators, whereas a fully logical decimal system has been in use in continental Europe and elsewhere for years.

It is considerably to our discredit that U.S. foreign-aid missions have been sending abroad specialists unaccustomed to the metric system. These people have been fostering education, mechanization, agriculture, and so forth, based on the English system, often badly confusing people in new nations, some of which had just adopted the metric system on gaining their independence from Britain, and hampering improvements in other areas where the metric system has been in longer use. . . . Surely a start in the right direction can be made with our people and products going overseas, as well as with education in our country in general. British manufacturers have learned that they have to make products with