Letters

Operant Conditioning of POP

In discussing the problem of the information explosion (Letters, 20 Nov.), Newman accurately notes that "we are not dealing with a machine problem but a man problem." The solution, he points out, is not to be found in better methods for processing more and more information, but in "control at the source" through the exercise (presumably by editors of scientific journals) of the "uniquely human skills" of evaluation, judgment, and selection. . . .

Assuming that faith in "publish (quantitatively) or perish" (POP) accurately reflects conditions in the real world, which I think it does, what we have is something approaching a classic operant conditioning experiment: the researcher-rat presses the publication lever as often as humanly possible, because he is periodically reinforced with a pellet of prestige or promotion. What is obviously needed is a change in the reinforcement schedule, so that mere quantitative lever-pressing is rewarded less frequently, while more desirable operants (superior teaching or qualitatively superior papers) are rewarded more often. . . .

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Evolution in France

Commenting upon Camille Limoges's study of the history of the concept of natural selection, Michael Ghiselin "(Darwin as Seen from Paris," Book Reviews, 30 Oct., p. 523) writes that in France "evolution was accepted most reluctantly, and natural selection even now seems to baffle the French mentality." Although the second point is all too true, the first is one more expression of a widespread misconception among biologists in this country. Descriptive (historical) and causal evolution need not be linked. The fact of evolution was indeed accepted *more* readily by the French than by American and other peoples. As for resistance to natural selection, Ghiselin's explanation presupposes that those who resist it understand the process in the first place, which seems self-contradictory. Concerning the French, at any rate, he misses the core of the question when he indicts religious beliefs. During the 19th century most educated Frenchmen, whose paragon was Voltaire, were anticlerical (*1*), and France has unquestionably been less religious than any other Western country since the French revolution.

Basically, understanding natural selection requires thinking in terms of populations, rather than of types; now the French mentality happens to be peculiarly typological. Another cause lay at the root of both relatively prompt acceptance of evolution and refusal of its Darwinian interpretation in France: Lamarck was French and Darwin was a citizen of the nation that was still the latent *ennemi héréditaire* in all hearts, despite a political friendship since 1832 (*2*). Only Anglophobic chauvinism can explain that Lamarck's evolutionary theory, very seldom recollected in France except as a mere laughingstock until Darwin's was heard of, was so resoundingly unearthed and welcomed and suddenly taken seriously. Thanks to Lamarck, evolution could be endorsed and matched against the English as a French invention with a non-English explanation.

As early as the turn of the century, evolution was being ratified by the French government. Huge funds were granted Alfred Giard to found the Laboratoire d'Evolution des Etres Organisés, a separate part of the Sorbonne. A statue of Lamarck was erected in Paris (but no street was given the name of Darwin). Most important, historical evolution was soon going to be introduced in the high school national syllabus (the *causes* of evolution are still presented as mysterious in French high schools today); a result is that evolution just stands to reason to about any Frenchman nowadays. As a Frenchman I was bewildered and at first incredulous when I found out in the United States that there still exist many high school teachers and other well-educated people, not to mention clergy, who oppose evolution on religious grounds. In France a number of clergymen were or are outstanding students of historical evolution, among them Teilhard de Chardin, who left a vision of the cosmos which, no matter how one feels about it, is hyperevolutionistic.

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Notes

1. It was long hard for someone who was not an atheist to get elected to the French academy of sciences. One possibly apocryphal but telltale story has it that an academician proposed at a session, "Let us swear that God does not exist."
2. As late as the early 1900's, boarding drills were still carried out in the French Navy with war cries of "Sus à l'Anglais!" (at the English!)—an example of typology, by the way, "l'Anglais" being singular.

Another Eclipse in 1973

The solar eclipse of 30 June 1973 will produce more than 7 minutes of totality, the longest span to occur until the year 2150. Mali and Niger in the north African desert where it will be best observed have a high probability of clear skies (*1*), and undoubtedly many more scientists than the number who viewed the 1970 eclipse in Mexico will want to observe the 1973 event. For the eclipses of 1966 and 1970, the National Science foundation supplied a remarkable amount of information concerning travel arrangements, local facilities, and scientific programs, as well as astronomical and geophysical data. Due to the high cost of the expedition in 1973, limited funds, inhospitality of the environment, and possible complicated international arrangements, NSF should assume a direct organizational role.

NSF could consolidate the many small expeditions (for example, those consisting of one to three persons with less than 500 pounds of equipment) into one or two major task forces that would travel as a unit to a predetermined site. The individual expeditions would then be able to share site surveys, legal arrangements, travel and support facilities, and save a substantial amount of money and effort in the process. In 1970 successful joint expeditions were carried out by the

French, Mexicans, and Russians. If government-sponsored flights (perhaps by military transports) could be arranged, they could carry, in addition to each contingent's supplies, a power generator for all, medical personnel, and even security guards. NSF would be responsible for the site selections (possibly the place of disembarkation) and for determining the length of stay. For most expeditions, arrival near the central line a week before the eclipse would seem reasonable. If government planning were begun soon, there would be ample time for participants to develop plans and equipment to comply with regulations.

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Reference

1. *Solar Eclipse 1970 Bulletin F* (National Science Foundation, Washington, D.C., 1970), pp. 359–401.

Political Discussions at Gordon Conference

At the Gordon Conference on Biological Regulatory Mechanisms last July, three sessions organized by the participants were held on topics of a political nature. In the first of these Mark Ptashne talked informally about his recent trip to Hanoi, Saigon, and Vientiane. The second session included films, produced by The Newsreel, on the People's Park at Berkeley and on the Black Panther Party; a discussion of political repression and of the newly formed Scientific and Medical Workers Committee to Support the Panthers; and a discussion of attitudes and values in science (pressures reinforcing destructive aspects of competition, lack of cooperation in science, exploitation of graduate students, scientific ethics, and so forth). In the third session René Thomas showed slides of his 1964 trip to the People's Republic of China.

These sessions were held at times that did not conflict with the scientific presentations. Over half those at the conference attended each one, and most of them actively participated in the discussions. The discussions, although quite serious, were relaxed and free of tension. Thus, these sessions did not hamper the main scientific business of the conference. Rather, we believe that they complemented it by helping to establish a climate of mutual concern and increased communication.

A similar session, with a similar degree of interest, was held at the Cold Spring Harbor Symposium. We hope that discussions of these and related issues will be organized regularly at scientific conferences and elsewhere.

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Manned Space Exploration

A person who deeply believes that man's explorations of the wonders of nature, using the procedures of science, rank high among the great triumphs of the human mind and the human spirit may be judged almost a traitor to that philosophy if he is opposed, as I am, to the space program of the United States and is especially opposed to manned space exploration. I could easily state the bases for my opposition. But I am willing to rest my case by calling attention to the nature of the arguments of those who favor manned exploration.

In a letter "Case for Apollo" (4 Dec.) A. W. England, of the Astronaut Office of the NASA Manned Spacecraft Center, argues that the U.S. space program has provided "a great challenge to our aerospace industries" and has given an unequaled boost to our economy and technology. Indeed the aerospace industry has been stimulated to such growth that it now "needs new projects to remain viable." We have created a monster and, it would seem, are now stuck with feeding it.

England scorns unmanned flights (they have been estimated by the Russians to cost only 5 percent as much as manned flights), largely because of the flexibility which can be achieved in manned flights. He says that the astronaut on the moon "walks over many miles of rugged lunar surface gathering interesting samples." Just when, incidentally, did these many miles of wandering occur!

England's defense of the space program, however, is by no means the most damaging one that has been offered. On a Channel 13 program in New York City broadcast in July 1966 the then Vice President of the United States said, according to an official transcript: "We have made more discoveries in space medicine that has relieved human misery in the last five years, than we made in medicine in the preceding fifty."

On request, the Vice President's office sent me an 11-page list of 31 examples supporting this statement. There were a few reasonable (but not very impressive) examples of vestibular research, cardiovascular research on concentrated synthetic diets, on low-residue diets, and studies of the processing of human waste products, and of the effects of low temperatures on living systems. None of these examples seem to me to constitute the slightest justification for the original claim. And the list also contained numerous entries of minor gadgetry (a switch actuated by voluntary movements of the eyes, a temperature transducer, respiration and blood pressure monitoring equipment, an automatic syringe, and so forth). In terms of the tremendous advances of medicine in the "preceding fifty years," the list is pathetic and ridiculous.

It has become very clear that the space program is not, in essence, a scientific program. It is a program of the military-industrial complex, which they frantically attempt to wrap up in the mantle of science in order to gain prestige and assure support. This is emphasized by the fact that, over the past year, numerous men engaged as scientists by NASA have resigned because of their disillusionment.

If we wish, as a nation, to give a great boost to our economy and our technology (to use England's own phrase), why does our government not, for a period of a few years, make a billion dollars a year available for research and development on a pollution-free engine for automobiles? If we wish to justify the surprising claim for medical advance that Vice President Humphrey made in 1966, why do we not allocate a billion dollars a year for a few years to assure that every qualified cancer research scientist in the United States is adequately financed?

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