Letters

Astrofantasies and Contracts

One of the recent letters commenting on G. G. Simpson's "The nonprevalence of humanoids" makes a number of statements of such definiteness that it seems to me essential to point out that these represent, at best, the opinions of a number of scientists in the mid-'60's, not some nearly finally crystallized consensus on a basic natural law, such as Newton's. I am referring to John Pfeiffer's letter of 8 May (p. 613) and to his statement—among others—that "a general point of view has developed during the past few centuries." One wonders how short is scientific memory, and if we really learn from experience.

While the Laplace nebular hypothesis held sway it was probably commonplace to talk about the plurality of inhabited worlds, but only 30 years ago H. N. Russell, then the dean of American astronomers, propounded the thesis that our solar system must have had a well-nigh unique origin—and the vast majority of astronomers followed him. In fact, during the '30's I was virtually the only astronomer who dared criticize the collision theory—and I was very nearly "read out of the party" for that offence. Now the pendulum has swung the other way, and many are willing, at the drop of a hat or of a NASA appropriation, to calculate precisely how many billions of inhabited planets there must be and why we should continue to listen for possible radio signals from possible intelligent beings living on possible planets circling other stars (project Ozma), even if it costs the taxpayers a hundred million dollars.

Pfeiffer says that "the sun is currently at a recognized stage in stellar evolution. . ." If this statement has any meaning, it must derive from current theories of stellar evolution. But only a little more than a decade ago an astronomer stated flatly, "I know more about what goes on inside the sun than about what goes on inside a boiling teakettle"—referring to the then current Bethe carbon cycle as the source of solar energy—and shortly thereafter came the proton-proton reaction; so that one could only conclude that that particular astrofantasist's ignorance of boiling teakettles must have been of abysmal profundity. Recently we have had at least two brief flare-ups of the belief that organic life was found in meteorites—but where is all that now?

During the past few years impressive evidence has been obtained about the existence of bodies with masses not much larger than that of Jupiter circling around other stars, but we do not yet know whether these are planets, or star-like objects, or different from either—they cannot as yet be seen. Arguing from general principles one might say that life could well exist outside Earth, but it seems to me that the only definite statement that is now scientifically tenable is that we do not know: we can neither prove nor disprove it. Is it possible that the sudden about-face comes from the desire to expiate the guilt of 40 or more years of fervent belief in the near-uniqueness of our solar system, or is it simply that the line for bigger NASA contracts forms to the right—in front of the rainbow labeled Life outside the Earth?

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Communication with the Humanities

I note a curious juxtaposition of two articles in the 5 June issue of *Science*. In a timely paper (p. 1199) Seaborg observes the apparent emergence of a new level of symbiosis between the arts, the humanities, and the sciences. He demonstrates his point through randomly selected representative examples and then goes on to the discussion of some rather broad principles, such as "the cultivation of equable and cooperative relationships among those of us who follow science and those dedicated to the humanities." The Seaborg article is immediately followed by Greenberg's useful warning in the form of a satire ("Let's hold a conference," p. 1204) showing how poorly planned attempts at interdisciplinary cooperation can degenerate into superficiality and waste.

In my view the two articles may be looked upon as complementary statements. When so considered, they point to the almost complete absence of unhurried, unfrivolous, formal dialogue between the sciences and the humanities about man's many ways of perceiving reality. Perhaps what is needed is a nontrivial common theme, such as the ubiquitous problem of *time* about which men of different professional backgrounds may speak with confidence without transgressing the limits of their fields of specialization. A written exchange of thought pertaining to a carefully selected central subject, planned and developed in detail, may then assist in guiding us to that "higher level of integration" for which Seaborg calls.

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While I have no fundamental quarrel with Seaborg's position, and have immense respect for any attempt to trace a route through this particular wilderness, I am somewhat uneasy with his treatment of the present state of symbiosis between natural science and the humanities.

It seems to me that two important qualifications are left unstated: first, that it is science which is providing the new frontiers for the humanities, not the reverse; and second, that the main applications of scientific techniques are to preliterate periods and to nonverbal activities. I do not mean to underestimate the significance of extending historical studies beyond the conventional boundary of Hellenic civilization. In my own field, politics, this new dimension is urgent for many reasons, among them the comprehension by Westerners of non-Western political institutions. Nor do I wish to demean the plastic and graphic arts.

Yet the core of the humanities, as I think we all understand them, is language and literature, and it is the relation of science to modern language and literature that is most at issue. How has science influenced the com-