Letters

Defense of Biosatellite Experiments

Robert Bolles has complained about the National Aeronautics and Space Administration proposals for experiments in space biology (Letters, 9 Aug.). In view of his complaint, there are several points of fact about space research which deserve attention. It is unfair to condemn all NASA space experimentation as "gimmicky," "low-yield," and "unsound."

Bolles admits that weightlessness cannot be sustained except in space, but this fact means that any changes in the effect of radiation during the weightless state can be evaluated only by irradiation in space. NASA's Biosatellite series is one effort to examine such problems. Experiments on Biosatellite II last year involved a variety of organisms and an onboard radiation source; data from these experiments has begun the understanding of the interrelation of radiation and weightlessness. This *cannot* be "readily simulated" by ground-based controls, yet must be considered as a factor on any extended space flight.

Of the other experiments included in the successful flight of Biosatellite II, several were included because the authors had extensively tested clinostats as possible simulators of weightlessness. A plant grown horizontally in a rotating clinostat never experiences the force of gravity from a single direction or angle, and the geotropic responses of its organs are definitely altered. The Biosatellite experiments compared the known response to rotation in a clinostat to the effects of space flight.

In addition, several experimenters had conducted background centrifuge experiments. One with frog eggs had both centrifuged and static ground controls. Two of the experimenters had tested the responses of growing wheat seedlings and tissue cultures to greater than normal gravitational forces in a centrifuge at forces from 10 to 500 times normal gravity. Wheat seedlings exhibit graded and visible effects on roots and shoots and changes in diameter and cell size, in response to increased effective weight at these *greater* than normal forces. NASA's Biosatellite program offered the opportunity to extend the picture of what happens to these tissues at *less* than normal gravity. Only future experiments in space can extend the picture for man and the many organisms of known value to man.

Finally, space research is *not* all glamour. There is testing, testing, and retesting in one's own laboratory, in the contractor's manufacturing plant, and at the launch site. Tests always seem to come on holidays, during heat waves, or at moments of academic crisis. The aura of the space age is very dim when all tests must start at 3 a.m. to simulate a daytime launch procedure.

Finally, we must contest Bolles's imputation of "automatic publication." All the experiments were repeatedly exposed to scrutiny by committees both inside and outside NASA during the more than 4 years required for their performance. That the preliminary results of carefully selected experiments using a unique and exciting instrument, the Biosatellite, should be published 6 months after the flight is hardly a breach of scientific decorum.

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Adolescence and Drugs

I support Minckler's letter (2 Aug.). To restrict discussion of the harmful effects of drug intake to the production of psychosis may be beside the point, but it is significant, nevertheless, that young men and women who take drugs are totally unable to resolve the normal problems that arise in their development. Adolescence presents the child with a multitude of problems and it is a sign of our times that we find people still wrestling with these issues well into adulthood. It is inevitable that the adolescent, in attempting to resolve these issues, is subjected to years of conflict, frustration, and anxiety. Yet it is the child's ability to tolerate these tensions while searching for solutions that is one of the indicators of a successful future outcome of the adolescent struggle. In no case in which drugs have been involved to any marked degree have I found a patient giving any evidence of movement in the direction of resolution of adolescent problems. Indeed, there has actually been movement away from these problems in the form of denial, avoidance, regression, and finally a total denial of pubescence. I have always felt that denial of puberty (and its problems) is an ominous sign. I assume that this also holds true where such denial is aided by the use of drugs.

I do not see, in the light of the above, the value of attempting to discuss drugs under the same heading as alcohol and tobacco. In my experience, neither of the last two agents cause this kind of phenomenon in adolescence.

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A Special Kind of Experience

Luther Carter's report on the traffic and road situation in our national parks (23 Aug., p. 770) is most timely. Under the double pressure of increasing public use (300 million visits expected by 1977) and a general focusing of attention on park matters in recent years, the National Park Service is facing perhaps the most difficult period of its history.

The NPS administrators are beginning to recognize a basic park purpose more fundamental than that expressed in the 1916 act of organization (how to promote public enjoyment of parks, yet preserve them unimpaired for the future). The new statement on road policy states:

> The single abiding purpose of National Parks is to bring man and his environment into closer harmony. It is thus the quality of the park experience—and not the statistics of travel—which must be the primary concern.

The concept is increasingly accepted that "how a person views the park can be as significant as what he sees." Our parks must "remain places to which people go for a special kind of experience, rather than merely places to view famous scenic wonders."

The speech by Senator Frank Moss

which Carter reports was singularly unfortunate—a reaction to disapproval of a particular road project in the Senator's state rather than a well-considered contribution to the public debate on park policy. Our legislators, too, must learn to evaluate park programs on qualitative grounds—admittedly a more difficult matter than relying on travel statistics and road mileage. Moss titled his speech "Parks Are for People," a too oft-quoted trite phrase which F. Fraser Darling and Noel D. Eichhorn (in a major study of park policy for the Conservation Foundation) dismiss as "inappropriate huckstering.". . .

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Ballast Overboard!

Our report about the transportation of European Cretaceous flint to North America largely in the form of ship ballast (*1*) prompted several readers to report additional localities. The vicinity of New York City appears to have been a favorite dumping area for ship ballast, in view of its history as a great seaport. An article by Rose (*2*) described flint pseudoartifacts on Glen Island in Long Island Sound near New Rochelle, and traces the derivation of other kinds of ballast found in the New York area. I. G. Sohn (U.S. Geological Survey, Washington, D.C.) reported collecting flint nodules in the Bronx at Hunts Point in the early 1930's. W. S. Newman (Queens College) mentioned European Cretaceous flint in landfill of Flushing Meadows. E. A. Weiss (Sun Oil Co., Philadelphia) reported heaps of large flints on the tidal flats of the Hackensack River south of Bayonne and Jersey City. H. G. Richards (Academy of Natural Sciences of Philadelphia) described flint with West Indian coral near Woodbury, N.J., south of Camden. W. A. Price (Corpus Christi, Tex.) told of having been tested by his geology professor with Dover flint in track ballast of the Northern Central Railroad near Baltimore, Md. C. G. Holland (Charlottesville, Va.) sent specimens of European Cretaceous flint that he had found on the beach of the Mattaponi River near Newington, Va., and one nodule from Tar Bay about 10 miles down the James River from Hopewell, Va. Frederick Johnson (R. S.