

drugs is more than a purely scientific decision. It is a complex process involving morals, ethics, and law. Courts can evaluate testimony from experts in all these fields and are therefore the proper ultimate authority. The Nuremberg trials demonstrated that very effectively.

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Djerassi challenges current objections to testing potentially injurious compounds on healthy individuals. If society would regard the testing of contraceptives as a form of employment attended by a certain hazard, the volunteer could be compensated for his or her cooperation commensurate with the risk involved, just as in other fields of employment. The pay could be a monthly stipend or a health and life insurance policy, or both. Such wages would be part of the budget for research on contraceptives, but since society will be the ultimate and prime beneficiary of this work, the cost should be met by public funds. This approach would ease recruitment of volunteers, discourage testing of imitative compounds, and most important, would counteract the idea that the poor or ignorant donated their health for the comfort of the well-off, be they individuals or nations.

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Permeation of Polyethylene Bags

Since 1963 we have handled and stored more than 80,000 samples of solid organic chemicals in amounts averaging much less than 1 gram each. These samples were placed in small polyethylene bags to prevent breakage, reduce handling, shipping charges, and storage space—all methods to effect savings. Unfortunately, we learned a painful lesson. The bags were permeable to some compounds if stored for a long time at room temperature. Although it is an excellent moisture barrier, the polyethylene film (0.005 centimeter) is penetrated by a variety of solid organic compounds, even though the penetration may not be observed for many months. Salts of amines can also penetrate the polyethylene, apparently by dissociation and recombination.

The problem first appeared when we noticed finger stains after handling

bags of colored organic compounds which had been stored about 1 year. In the literature we found many papers on the permeation of liquid hydrocarbons through polyethylene, but none pertained to solids (1). Like rotten apples in a barrel, the permeation to other samples occurs because the bags are often stored in tight bundles. After the saving is realized from shipping the samples in such bags, I recommend that the contents be transferred to the fragile, bulky, heavy, but impenetrable old faithful glass containers for permanent storage.

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Reference

1. L. M. Robeson and T. G. Smith, *J. Appl. Polymer Sci.* **12**, 2083 (1968); R. Y. M. Huang and V. J. C. Lin, *ibid.*, p. 2615.

Man's Rights over Nature

Fahnestock's letter (3 Oct.) and preceding letters help to bring man's rights on earth back to public attention. If the conservation zealots had been as active a century ago as they are today in the United States they would have succeeded in setting aside the Great Plains as a National Buffalo (Bison) Park, and we would be importing most of our wheat.

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Fahnestock is correct that man must have air, water, food, and shelter. If this is all he wants, we might be able to maintain today's human population and even part of the next decade's deluge. However, he is naive to think that the threatened extinction of the eastern bald eagle from DDT poisoning is in itself the major cause of alarm among professional ecologists. Its far greater significance is that something is wrong with calcium metabolism and steroid hormone function in eagles because of DDT. The effects happened to appear first in certain raptorial and pelagic birds, but since life processes are essentially similar in all organisms, it seems likely other creatures will suffer as world usage (U.S. usage is declining) of DDT increases. . . .

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Fahnestock's attitude toward ecological change and its effect on other organisms is sophisticated in presentation and superficially far less objectionable than the concept of the conservationist "as a yellow-bellied sapsucker," but I believe that it stems from the same rationale. What man is doing to the world is different by many orders of magnitude from what the dinosaurs did; one need not read any further than that issue of *Science* to have this point brought home. It is inevitable that man's increasing population and increasing degradation of nature will destroy him. The time may vary with the rate of population increase, but the ultimate solution to the problem of man seems inevitable if man continues on his present course.

The need for other life forms has to be put on a simple economic basis; I fully agree that emotionalism does not help. Of course, it does not hurt to cut down a few old redwoods and other such trees useless to the practical man. However, we do not live entirely in a plastic world. Without vegetation to produce oxygen, man dies; there must be a point where the smog becomes so thick that it is economic not to destroy trees. In the same sense, a complex interrelationship of organisms which has taken millions of years to evolve can probably survive having some of the life strands snapped by artificial extinction. Still, a single crop agriculture will eventually be destroyed by a disease mutation, since this evolutionary process will continue regardless of what man does. All the eggs in one basket makes it ever so much easier to wreck the eggs.

Perhaps the best nonemotional reason for seeking to retain a few species is for the practice it may give in picking what should be saved. If man cannot save the bald eagle and other frills, it follows that he will never be able to save himself. It is not much of a jump from making a choice among species to making a choice among racial, religious, or economic groups.

A final pragmatic point to make is the biological truism that no organism can survive on its own waste products. Every movement toward changing the world to a place for man to the exclusion of other living organisms leads to this end. A world aimed at being exclusively ours will be a world in which man cannot survive. . . .

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