Giant Panda Doesn't Travel

The Himalayan giant panda was not, as Oberle reported ("Endangered species: Congress curbs international trade in rare animals," 9 Jan., p. 152), granted a reprieve when the President signed PL 91–935 to protect endangered species. The animals are known to exist only on the Chinese mainland and in Tibet, and the State Department refused to permit their importation even in the days when Mr. Nixon was Vice-President, apparently deciding that giant pandas are not only black and white but red all over.

The species is on the endangered list, but appears to be increasing its numbers both in the wild and in Chinese zoos. The giant panda appeared on the cover of *Science* some years ago (7 Apr. 1967), in connection with a review of a book, *Men and Pandas,* to which Oberle is referred for the U.S. import policies concerning the giant panda (*ibid.*, p. 53).

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Population Controls

Spengler's article "Population problem: In search of a solution" (5 Dec., p. 1234) correctly states the issue of population control as one involving a judicious application of "carrot and stick" motivational techniques, but he makes several important naive assumptions in his prescriptions for coping with large-scale child-bearing patterns. . . . We are dealing with the issue of providing motivation to those persons whose systems of reward-expectation are generally highly deficient with respect to reproductive control. . . . If modern psychology has taught us anything about motivating behavior, we have learned that time of delay of reward—be it symbolic or material, positive or negative—is one of the most important factors in attaining new learning.

Who is willing to support research of the following dimensions: (i) using analyses of variance methodology, present a sufficiently large group of persons with a series of rewards—money, educational opportunities, hard goods, vacation trips, and so forth; (ii) distribute these various rewards at different times—weekly, monthly, annually, so as to find the optimal points of interaction between delay of reward with amount and type; (iii) analyze results in terms of census subclasses, then validate the original findings by administering the optimally effective rewards differently to the various subclasses in the population. When sufficient data have been accumulated to determine the most effective system of rewards, a government agency should administer them to the population at large in order to attain a population growth rate of zero or less.

A system of negative rewards (punishments) might also be considered, but would require the ministrations of a police state or certainly of a nondemocratic government institution. The scientific problems are identical and merely require determination of the parameters of effective negative rewards: imprisonment, celibacy, sterilization, taxes, and so forth.

Some might say that both alternatives smack of thought control, deprivation of personal liberties, and moral evil. Of course, they are correct. Consider the final alternative: total economic collapse and demoralization of earth's human population within two or three generations!

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The point that "there exists no General Will to bring about these [population] objectives" is well taken. However, Spengler's assertion that "reliance has been placed almost entirely upon 'private conscience' " is misleading. Even in the relatively advanced state of California in 1969, the Governor vetoed, on moral grounds, a bill which would have legalized the sale of prophylactics to unmarried persons under 18 years of age; and in 1950 the State Attorney General issued an opinion stating that consensual vasectomies were illegal because they were against a public policy of promoting a high birthrate and because they were proscribed by the law against mayhem, an opinion which had the force of law until 1969. Thus "reliance" has actually been placed on what amounts to a coercion to reproduce, and the coercive force is greater than is often realized.

One should not overemphasize the great "utility or satisfaction which parents expect to derive from their children" as a factor in the population explosion. In several countries which legalized abortion, including Hungary, Bulgaria, Rumania, and Japan, the birthrate immediately dropped by around a factor of 2. In the United States, unwanted pregnancies accounted for about 40 percent of births between 1960 and 1968, according to Charles Westoff of the Princeton University Office of Population Research. But even legalization of abortion does not actually confer "unrestricted freedom to reproduce" (or not to reproduce), because such measures cost time and money to those who avail themselves of them. Birth control will truly be freely available only when the more impoverished members of society are given just compensation for the time they spend on it. Under such a truly free-choice situation, the evidence cited above suggests that the birthrate would immediately drop by more than a factor of 2, enough to halt the population explosion.

How long free choice would continue to hold down the population is a matter for conjecture. To the extent that there is an innate, inherited desire to have children, as distinguished from desire to have sex, differential reproduction would increase its effect on birthrate. However, any substantial change in genetic profile of the population could hardly occur in less than several generations; and since desire to have children is probably governed more by cultural than by genetic causes, the evolutionary process might be quite slow, and thus freedom of choice might conceivably maintain a satisfactory level of population for thousands of years to come. In any case, free choice is a goal which is clearly achievable, since the majority of people in the world would probably not oppose individual freedom of choice at the present time; and this could hardly be true of proposals for compulsory control. Consequently, in suggesting practical programs for eliminating excessive reproduction, Spengler should not ignore the immediate task of working toward greater freedom from present governmental restrictions on birth control.

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An overlooked area in the population explosion is that of geriatrics . . . efforts to control reproduction through contraception are important, but present convalescent home facilities are increasing day by day and are still insufficient to care for the problem of domiciliary care of the geriatric patient . . . physicians should "pull the electric plug" on the sophisticated devices used to keep

"human vegetables" alive when there is no longer hope for them. Many permanently impaired individuals become monuments to the dubious therapeutic triumphs of medicine. It is obvious then, that a modified or controlled euthanasia program should be instituted. The theory that someday, somehow, these patients may permanently recover, of course, overlooks basic physiologic and biologic facts of the central cerebral nervous system tissue which never recovers from permanent damage. The expense and misery associated with these prolonged vegetative states which the geriatric patient survives are dehumanizing in themselves and pose a question that is far more thorny than that of contraception and procreation at the other end of the life scale . . . such nonproductive "medical triumphs" should be curtailed stringently. Domiciliary care homes throughout the United States, with their increasing geriatric census and ability to extend life, condone a "population body count" ethic. . . .

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I heartily wish Spengler success in his initiative against overpopulation, but he should not ascribe to Dr. Johnson Oliver Goldsmith's couplet from the conclusion of *The Traveller:*

How small, of all that human hearts endure,
That part which laws or kings can cause or cure.

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Energy: The Ultimate Raw Material

Berkowitz, in his response to Sporn's editorial (Letters, 19 Dec.), overestimates by about a factor of 10 the energy released artificially by man. Global fuel consumption each year is the equivalent of about 5.5×10^9 tons of coal (*1*), or a heating rate of 4.9×10^9 kilowatts, all of which reaches the atmosphere. The atmosphere rejects heat to space at a rate of 1.24×10^{14} kilowatts [solar flux $\times$ (1 $-$ albedo)], which is 25,000 times the artificial output, not 2500, as Berkowitz claims (*2*). The earth's surface receives and returns a total of 2.72×10^{14} kilowatts, mostly by blackbody exchange with the atmosphere, but the atmosphere-space exchange is the significant quantity.

Berkowitz rightly states that the "environment cannot support the unlimited growth of power generation," but the *overall* heat production rate is not likely to be the limiting factor. Even 20×10^9 people, each producing 20 kilowatts of heat (twice U.S. average), would add only 1/300 of the present atmospheric heat load. This would raise the average temperature of the earth by about 0.25°C. *Local* thermal effects are a much greater problem and are already noticeable. For any great increase in energy consumption we will have to disperse the heat produced more carefully.

The point of this letter is not so much to correct the error quoted by Berkowitz as it is to remind Sporn's critics that energy is the ultimate raw material. It alone is convertible into most of man's other material requirements. At an energy budget of 20 kilowatts per person, we could maintain a worldwide living standard near the present U.S. level even when we have exhausted our high-grade mineral resources. We could do this without placing an impossible heat load on the earth for a very large population, but not for an "unlimited" one. I conclude, with Sporn, that (i) energy increase and environmental control are possible and compatible; (ii) other factors than energy will soon limit population growth; and (iii) concern over population growth and the environment is beneficial if it leads to constructive study and action. Our technology can buy us time to make the right choices.

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References

1. *Minerals Yearbook, 1967* (U.S. Bureau of Mines, Government Printing Office, Washington, D.C.), vol. 4, p. 6.
2. P. A. Sheppard, in *Encyclopaedia Britannica* (Benton, Chicago, 1969), vol. 15, p. 277.

Drug Quality: Whose Responsibility?

Louis Lasagna, in his article "The pharmaceutical revolution: Its impact on science and society" (5 Dec., p. 1227), attributed to me the opinion "that the main trouble [with therapeutic equivalency not guaranteed by chemical equivalency] lies in failure [of manufacturers] to adhere to USP and NF criteria, not with the criteria themselves." In a 1961 talk I said: "The existence of inferior quality drugs or subpotent drugs sold under a USP or NF label is a reflection of inadequacies and shortcomings on the part of the manufacturer of the drugs, not on the part of the compendia." Later in the same talk I commented: ". . . the inescapable fact is that the USP and NF are completely adequate to assure good quality drugs by any manufacturer who really *wants* to make good quality drugs." These comments, taken out of context, easily lend themselves to being paraphrased as in the above instance.

My position is that while good quality, biologically active drug products comply with compendial standards, the reverse is not necessarily true; that unless biological activity is actually demonstrated on the specific formulation before it is marketed, and unless the factors responsible for the biological activity are "locked into" each manufactured batch by effective in-process controls, that, compliance with compendial specifications notwithstanding, biological activity can be questionable.

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Privacy Invasion

On two occasions in the last month, I have been asked to supply my social security number, first on an application for a government grant, and second on a questionnaire for the *1970 National Register of Scientific and Technical Personnel.* Perhaps I am wrong, but I understand that the social security number was established to keep track of social security benefits. I can see no reason why it should be used for other purposes except for the convenience of computer interchange of information. Since there are serious possible dangers to individual privacy and freedom in computer interchange, I believe that the use of the social security number should be eliminated for purposes other than social security. Perhaps those who disagree with me will reply publicly to this letter so that I and others can think more deeply on this matter.

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