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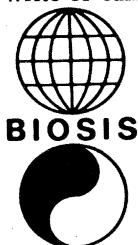
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all mankind, but not if in so doing we eliminate dignity entirely. We must work to raise the standard of living of the underdeveloped countries of the world, but not reduce all the people of the earth to poverty in the process. Hardin's editorial tries to express the fact that, today, "one world" would be a total, miserable mess in which civilization itself would be hard pressed to survive. Man is not served by the creation of equality at the expense of dignity.

Perhaps the position of America as a wealthy society is fortuitous and undeserved; but can the poor of the world, and future humanity as well, be helped by universal poverty? If the resources of the earth can support the present large and ever increasing human population; if the planet will not be rendered lifeless in the attempt; if other forms of life will not have to be eliminated entirely to accommodate our overabundance—then demonstrate that this is so, and refute the arguments of those who say that it is impossible. But do not criticize those who oppose "one mouth, one meal" without giving a method by which this may be attained.

GERALD AUDESIRK

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The replies to my editorial are precious source material for anyone interested in human reactions to the violation of a taboo. The point I made was well made by Malthus (1) in 1803, by W. F. Lloyd (2) in 1832, and very well indeed by John Stuart Mill (3) in 1848 in his *Principles of Political Economy*—"Society can feed the necessitous, if it takes their multiplication under control; or (if destitute of all moral feeling for the wretched offspring) it can leave the last to their own discretion, abandoning the first to their own care. But it cannot with impunity take the feeding upon itself, and leave the multiplying free."

The logical point has never been refuted, but the knowledge is repressed again and again. How can one shatter a taboo that impedes rational adjustment to the realities of the world? I don't know. My essay, "The tragedy of the commons" (4), was one attempt; elucidation of its international implications was the purpose of my editorial.

"Nature" acts as if she understands the principle. This was the thrust of Eliot Howard's *Territory in Bird Life* (5); in recent years V. C. Wynne-

Edwards (6) has also elaborated the point. So long as population growth is uncontrolled, the defense of territory is necessary for the survival of human dignity *somewhere*. We can call such a statement "selfish" if we wish—but what do we gain from the pejorative?

There is, of course, the vexing issue of ethnocentrism; if not all groups can be saved, who shall be favored? Only the mythical Man from Mars could give an objective answer to that question. In his absence, each of us must give his own reply. I have no objection if others, made of nobler stuff, wish to give their wealth to Africans, Indians, Pakistani, or what have you. In truth, I confess I cannot bring myself to do so. If the poor of the world will not, or cannot, "take their multiplication under control," I shall try to protect my access to the goods of the world, undeserving though I may be, and seek to save some of the earth's resources for my grandchildren and theirs.

GARRETT HARDIN

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References

1. T. R. Malthus, *An Essay on the Principle of Population* (Johnson, London, ed. 2, 1803).
2. W. F. Lloyd, *Two Lectures on the Checks to Population* (Collingwood, Oxford, 1832).
3. J. S. Mill, *Principles of Political Economy* (Murray, London, 1848).
4. G. Hardin, *Science* **162**, 1243 (1968).
5. E. Howard, *Territory in Bird Life* (Murray, London, 1920).
6. See V. C. Wynne-Edwards, *Animal Dispersion in Relation to Social Behavior* (Oliver and Boyd, Edinburgh and London, 1962).

fd Virus Photo

Bryce Nelson's report (News and Comment, 27 Aug., p. 800) about the erroneous description of a photo in the 12 August issue of the *New York Times* as that of a "DNA molecule," rather than an "fd virus," further confuses, rather than clarifies, a very simple story. The story is that there is in fact no "story," except that the *New York Times* made an error.

In the 2 July issue of *Science*, Gabor, Kock, and Stroke (p. 11) described the holographic sharpening of an electron micrograph of the fd virus. The electron micrograph had originally been recorded by Crewe as a part of a collaborative effort by Crewe and Stroke. Subsequently the *New York Times* requested a photograph of the sharpened image of the virus that revealed a double helical stranding. The photograph



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was sent with the caption "Double Helical Structure of an fd Virus." The reporter in his story introduced an error by describing the picture as that of a DNA molecule.

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Research on Narcotic Antagonists

Allen Hammond's description of the current status of narcotic antagonists (News and Comment, 6 August, p. 503) correctly indicates that very little research has been done on extending the duration of action of existing antagonists, mainly because of lack of funds and lack of enthusiasm on the part of the pharmaceutical companies.

Recognizing an urgent need for action, New York City, with the help of the Ford Foundation, has recently approved six research proposals in this area at the total cost of \$384,000 for the first year. Money for initiating additional projects is now available. Information about the submission of proposals is available from the undersigned.

LAWRENCE BERGNER

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Two Kinds of Perpetual Motion

Concerning which law of thermodynamics would be violated by a perpetual motion machine, both David (Editorial, 28 May, p. 901) and Moeller (Letters, 15 Oct., p. 227) are partly right. The confusion probably arises from a distinction, which was first made by Ostwald, between two kinds of perpetual motion (1). Perpetual motion of the first kind (energy creation) would violate the first law of thermodynamics, while perpetual motion of the second kind (entropy reduction) would violate the second law.

DAVID L. WILSON

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Reference

1. M. Planck, *Treatise on Thermodynamics* (Dover Publications, New York, ed. 3, 1926), pp. 89-90.

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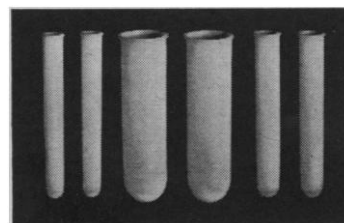
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