

Warren Weaver Jan 1, 52

## HUMAN ECOLOGY

The following observations seem worth stating:

- 1) That a great deal of trouble which on the individual level expresses itself as want, hunger, suffering, and anxiety, and on the international level expresses itself as fear, distrust, political instability, and world tension is due basically to the fact that the ratio of resource to population is (a) highly variable from region to region of the earth, and (b) is threatening to decline, especially where it is lowest, due primarily to geometric increases in the denominator and at most mild arithmetic increases in the numerator.
- 2) That it is, in the long run, illusory, incomplete, and sometimes definitely harmful to concentrate attention on some single factor which apparently makes the numerator bigger or the denominator smaller. Food supply, health, population control, and education are four basic factors which are intimately related: but many other factors (transportation, communication, capital structure of the economy, religious and cultural acceptability of new ideas or procedures, value systems, etc.) essentially condition the problem.
- 3) That the older - say the Victorian - world could stably tolerate, between various parts of the world, a wide divergence in the ratio of resource to population. These divergences could be stably tolerated primarily because communication and transport were then such as to leave the world divided into fairly isolated compartments. But in the modern world this is no longer so. We now have the confusing tragedy of regions (India is an example) where the people are now growingly aware of the rest of the world, have determined to compete on modern terms, but are essentially handicapped in so doing by their religious and cultural ideas. Thus Oriental philosophy often prefers tradition to change, even though the change involve improvement; and their religion also emphasizes acceptance and gives little training in the technic of decision.
- 4) That it is intolerably degrading to the human spirit to accept as an inevitable fact either the continuing decline of this ratio or the Malthusian idea that it can only be increased, from time to time, by decreases in population resulting from catastrophic wars, famines, or similar disasters.
- 5) That progress in controlling the population numerator should be vigorously attempted, both through long-range studies and educational campaigns and also through such more dramatic and immediate moves as might prove feasible: but that progress in population control is likely to be slow so that it will almost surely be necessary to buy time by making every possible effort to increase resources, particularly food.
- 6) That birth control is only one limited aspect of population control.
- 7) That birth control seems chiefly to involve:
  - a) The application of known procedures where these are culturally acceptable;
  - b) The development of improved (cheaper, simpler, more effective) procedures;
  - c) The reorientation of cultural and religious ideas to permit effective use of present or future procedures.

8) That there is a large amount of opinion concerning the effect upon birth rates of increasing food supply, of improving health, of developing education, etc.; but that more study should be given to the many interrelated factors to see if there are in fact any general laws governing these relationships.

9) That a paradoxical difficulty exists. For, on the one hand, these problems are all interconnected; and, on the other hand, it is a practical impossibility to attack all phases simultaneously and everywhere.

10) Stated in financial terms, this last point means that vast funds, and very large resources of trained personnel, would be needed to attack such problems unless some very careful selective process is used to delimit the approach.

11) This selective process involves danger, and should be done on the basis of expert study and advice. For if the selection is based upon an assumption of isolation that does not correspond to the real situation, then the resulting activity would be just another misguidedly narrow attempt at an essentially broad problem.

12) There are certainly many safely isolable features of the general problem. For example, it would be a clear and unquestioned advance to (a) discover a cheap and effective "pill" which would suppress ovulation, or (b) demonstrate an economically and nutritionally feasible way to raise microorganisms for food, or (c) demonstrate some technique for increasing materially the food we get from the sea, or (d) unravel the mystery of the photo-synthetic cycle, or (e) develop a new way for transforming radiant energy into chemically stored energy, or (f) learn the basic genetic mechanisms that affect the yield of crop plants, or (g) study insect nutrition, physiology, biochemical genetics, etc., as a basis for understanding insect control through insecticides, or ..... (I do not attempt to give examples in public health, education, economics, sociology, anthropology, etc.)

13) Then it is also certainly possible to delineate the situation in a wholly different way - namely, by trying to study a whole group of the more important aspects for some very limited community. This is what Mayer seems to have done with so much success at Etawah in India. It might be most interesting to go to study the Etawah project, to see if something like it might be set up in a rural district of, say, Japan.

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