

Biospheric Stability and the Stratosphere

Although the stratosphere can scarcely be regarded as part of the biosphere, it is quite vitally important to biospheric stability. Consequently it is a source of profound relief that continuing efforts in a few remaining quarters to develop large numbers of supersonic transport aircraft (SSTs) have run into so many problems that they seem bound to fail. Indeed it has long been the conviction of many of us that it would be sheer folly of the most dangerous kind to continue with uncontrolled multiplication of Tupolev, Concorde, or any other SSTs, before it has been scientifically demonstrated that their use would not lead to a serious reduction of the ozone in the stratosphere—remote though this may seem. It is also a relief to note that the threat to stratospheric ozone posed by the chlorine-containing fluorocarbons (fluorochlorohydrocarbons or 'freons') used as aerosol propellants and in refrigeration and air-conditioning, is now becoming so widely recognized that their production may soon cease. Thus it was high time for the establishment recently of a U.S. Federal Interagency Task-force on Inadvertent Modification of the Stratosphere, while the reputedly largest-by-far manufacturer of these substances has undertaken, 'If . . . credible scientific data show that any fluorocarbons cannot be used without a threat to health, [to] stop production of the products in question' (*Du Pont Management Bulletin*, 4(1), p. 4, February 1975).

This refers to human health; but what of the other biota on which Man, though generally the world's predominant, is dependent for the wherewithal of life? To a remarkable extent it has been the ozone 'shield' in the stratosphere that has allowed life to develop on Earth, and enabled plants and animals to evolve and flourish. For the ozone absorbs in its own formation, before they can reach the surface of the Earth, most of the ultraviolet rays emanating from the sun. These rays are lethal to many microorganisms, which in evolution must have preceded more complex organisms—including, ultimately, Man, who is himself adversely affected by certain wavelengths of ultraviolet radiation, which, for example, are authoritatively reported to accelerate ageing and increase the incidence of skin cancer. Indeed it seems quite likely that, were it not for the ozone shield, life on Earth would not have evolved, at least in anything like its present vast range of forms, while drastic reduction of the ozone shield could conceivably jeopardize life on Earth. Consequently any threat to the ozone shield should be viewed with the gravest possible concern, and to go on perpetrating the means of its possible destruction would seem to us the height of irresponsible folly pending scientific demonstration that specialists' warnings are unfounded—see, for instance, Professor Harold S. Johnston's 'Pollution of the Stratosphere', published in our Autumn 1974 issue (pp. 163–76). Other threats to the ozone shield include nuclear attacks, which produce large amounts of nitric oxide, and it has been calculated that a major event of this kind could lead to a 50% reduction in stratospheric ozone (Paul J. Crutzen in *Ambio*, 3(6), pp. 201–10, 1974).

There are quite numerous ways in which the destruction of ozone is known to be catalyzed by such substances as water vapour and oxides of nitrogen, which are emitted in large amounts by SSTs, and by chlorine which is allegedly released from freons decomposed by ultraviolet radiation in the stratosphere. Moreover, as we pointed out in our Autumn 1974 issue ('Thoughts on Some Conceivable Ecodisasters', *Environmental Conservation*, Vol. 1, No. 3, pp. 177–89), 'SSTs are apt to fly largely at an altitude not so very far below that of maximum concentration of ozone in the stratosphere!' Surely we should, in such grave and controversial matters, pursue a safety-first policy of 'guilty until proven innocent'—rather than the reverse, as has been suggested most frighteningly in some interested circles.

N. P.

The Turning-point: Towards a New Ideology?

At the beginning of the year, we all bid each other our traditional 'Happy New Year', but few of us could really believe in a 'bright future'. It seems that we are now living at a major turning-point in the history of our industrial society—the basic premises on which we have built it are being questioned more seriously and more widely than ever before.

Economic development, with its special set of human values, has brought, is still bringing, and will continue to bring, a certain happiness to large numbers of people; but how lasting is this materialistic euphoria? Is it not, with all its implications, undermining the long-term stability of our society? Science—Man's striving to understand the natural forces with which he has evolved—is the cornerstone of modern society; but how much

longer will we live before there is a major nuclear confrontation or reactor accident or sabotage, before great tracts of ocean become cloudy and lifeless with the activities of deep-sea dredges and the effluent of 'gushing' off-shore oil-rigs, and before that sensitive subject, the prolongation of human life and the raising of the human birth-rate, produces far more people than we can lastingly support? Certainly not long; and yet these are some of the serious traps into which science is leading us. We cannot forget what science has conceived, but that in itself is no reason for continuing blindly in the same direction. When will we see that freedom and democracy only diminish when men are faced with expanding populations of their species, and are increasingly tied to industrial machinery? Money, the currency which maintains the structure of our society, just as energy is the basis of organization in natural systems, has brought achievements such as the virtual monocultures of people in urban centres, that would be inconceivable in the traditional natural world from which we only recently stepped; money is thus an ecologically amoral quantity. In short, the humanistic values of our modern society are entirely discordant with the 'laws' of the biosphere in which we live.

It seems really that in the long term the 'human condition' has changed but little; our modern society has failed to fulfil what is probably its most general aim—to remove natural constraints and make men 'free'. In medicine we are substituting long-term misery for short-term suffering; in science generally we are creating problems at a greater speed than we are solving them. In our institutions we are gradually introducing ourselves into a totally Man-oriented sphere of existence that will limit us as surely as the traditional natural world from which we are supposedly thereby escaping. Only if we accept this predicament as a serious problem can we then proceed to analyse the behaviour of our society and find out where we have gone wrong.

The thoughts and endeavours of industrial Man have ancient roots. Christianity exhorted people to increase in numbers, convert their 'savage' brethren, and control the natural world; the human soul was sacrosanct. Progress in the size and development of his populations was thus built into the existence of Christian Man. Christianity in turn had provided a solution to problems created by human consciousness, embodied in questions such as 'Who am I?' and 'Where am I going?'. We can elaborate on this theme, as we see it, and mention *en passant* that those beliefs (such as Taoism) that instructed Man to live more with Nature than against her, have probably been no less undermined by western materialism. But the point is that our 'ecological crisis' has deep origins.

It is ironical, although perhaps not so surprising, that the very feature which has long been held to have set Man most strongly aside from other animals, namely human consciousness, should now be the one which is leading him into a blind alley—a Man-oriented biosphere—from which return will be difficult. But, largely causative of our environmental difficulties as it is, human consciousness cannot be done away with—it might, however, be diverted along new pathways. For example, instead of conditioning our children to an addictive admiration of the artificial 'miracles' of the industrially-based way of life, we can 'turn them on' to the wonders of the natural world which we have for so long striven to imitate and overcome; indeed, this is happening increasingly, but we have a long way to go before public opinion 'feeds back' effectively into the alteration of society's behaviour. Civilization may call such communal self-criticism a symptom of decadence, but all we need is a change in direction—we have reached a turning-point.

Many of us have come to feel that we now face a critical bifurcation in the evolution of human society. On the one road we continue to believe in the sanctity of the behaviour of 'developed' Man, and rush on blindly into an uncertain future, believing always that science will 'find a way'—somehow producing solutions to all our problems, both those which currently exist and those which it will inevitably continue to produce. On the other road we realize that this is merely a fatalistic form of escapism, and we turn around, so to speak, to face the realism of the finite but beautiful little world in which we live. We face a bifurcation because, by continuing along the first road, we will soon have precluded any voluntary pursuit of the latter course. If we are to keep our options open, however, the enemy whom we must stand up to is ourselves and our own attitude towards the biosphere.

Perhaps our current so-called economic crisis will provide us with a 'breathing space'—in general terms, a time for looking about ourselves, assessing how far we have got and where we wish to go. In science, for example, we can concern ourselves with an inventory of what we have found to date, rather than 'ploughing on' in our peculiar myopic way.

One cannot be pessimistic about the future of *Homo sapiens* as such—there is little question that Man will survive; but our concern should be for the kind of world in which we will persevere. Like Aldo Leopold, many of us feel that our right to watch wild animals and plants is at least as great as that of watching television; that to stand up alone and sing in the middle of a wilderness is our right as inalienably as is our freedom of speech.

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