BIOPOLITICS AND THE PHILOSOPHY OF EVOLUTION

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The concept of Biopolitics, as developed by Dr. Vlavianos-Arvanitis in her recent article, is derived from a knowledge of the natural biological world, or "bios" as it is termed. To virtually all modern biologists this world can only be understood fully in the light of evolutionary theory, and therefore the purpose of this paper is to evaluate briefly some aspects of the biopolitical programme from an evolutionary point of view.

Biopolitics, then, is founded on the relation between the human species and the natural world, which is a complex, multi-stranded relationship including the following aspects:

1. "Bios" is perceived as a harmonious, integrated system of organisms that offers a model, or analogy of how human society should be organised beneficially.
2. "Bios" is a source of smaller-scale models of how particular human problems might be solved, e.g. the brain as a model for computers.
3. "Bios" is a system of which humans are an integral part, from which they gain their resources, and which is altered by their activities.
4. "Bios" is the key to understanding human biology, and is therefore relevant to improving the physical well-being of humans by medicine and bio-technology.
5. "Bios" is a source of psychological pleasure and creative inspiration.

Each of these strands correspond to one of two essential viewpoints. The first sees "bios" as a model for human activity. The second sees it as the human environment. Each of the viewpoints generates certain questions of a generally scientific nature, and other questions of a generally moral nature. Although these two kinds of questions are not entirely separable from one another, it helps to clarify the issues and the problems, to deal with them initially as if they are.

"BIOS AS A MODEL"

The relevant scientific question from this point of view is: what are the actual processes that cause the origin and maintenance of the biological world? The moral question that follows is: are such processes, in general, suitable for adoption by human society as the means of its own maintenance?

Ignoring as far as possible the impact of human activities, the biological environment gives the appearance of great stability, with the different species of plants and animals permanently present, and their numbers remaining roughly constant. There is also the appearance of a harmonious co-existence, for the individual members of a species often act as if for the good of the species as a whole. Even more, the activities of individual organisms can often seem as if they are for the good of the whole community of several species.

Some examples illustrate this point. Predators do not usually consume so much of their prey that the prey is driven to extinction. It is as if they husband their resources for the long-term advantage of the species as a whole, rather than seek their host species to extinction. Competition between different species for resources is not usually too great, because there is not normally more than one species in a community with identical requirements: each species is to some extent specialised in its own unique way, a phenomenon called competitive exclusion. Furthermore, there are numerous cases where the members of distinct species actively co-operate in symbiosis, each offering to the other certain benefits. Thus lichens consist of a closely integrated relationship between an alga which fixes carbon dioxide in photosynthesis, and a fungus capable of utilising organic matter directly. Another familiar example is the hermit crab carrying a sea anemone on its back; the crab gains scraps of food from the sea anemone, while the sea anemone gains transport from the crab.

Within a single species, there is often the formation of societies, wherein different individuals have different roles to play, for the apparent benefit of one another. Examples are the beehive community, and amongst mammals a troupe baboons.

To understand how this appearance of harmony and stability exists it is necessary to take an evolutionary view, and it will become clear that, in human moral terms at least, "bios" is not actually as idyllic as it seems.

WHY DO ORGANISMS CO-OPERATE?

The Darwinian theory of evolution by natural selection may be simply outlined. Suppose two individual organisms differ genetically, and that this difference causes them to produce different numbers of offspring from one another. It follows that, over a series of generations, there will

be an increase in the numbers of the descendants of the more prolific kind and a decrease in those of the less prolific kind. There will be an increase in the fitness of the population as a whole, as represented by an increase in the expression of those characters that tend to promote reproductive success, such as the ability to avoid being eaten, the success of finding mates, or simply fecundity itself. For present purposes, the important point is that individual organisms are selected, on the basis of their individually "selfish" interests. If one organism spends time and trouble co-operating with another, then on the face of it, it is likely to suffer a reduction in the effort it can put towards its own reproduction. It, and its similarly disposed descendants, will therefore be selected against and the tendency to co-operate will disappear from the population. The worker bee will fare less well in terms of reproductive success than the queen or drones; the guarding baboon is likely to produce fewer offspring than the baboon that it protects from hazard. Conversely, individuals that behave the most selfishly will gain a greater share of the available resources, and to better that less selfish individuals. How then is it possible to explain the evolutionary origin of the co-operation that does exist in "bios"?

Predator-prey balance

Ecologists have long understood Lotka-Volterra cycles, which arise because the rate of reproduction of a prey population is proportional to the amount of prey available. As they prey number rises, so the predator numbers start to rise with a short time lag. But as the number of prey being consumed rises, the prey population starts to fall. The number of predators then starts to fall too. Thus the population size of both the prey and the predator oscillates about a mean value, rather than either of them falling to zero. There is no co-operation between the individual predators to conserve their resources; the apparent co-operation arises as a simple mathematical consequence of selfish behaviour by the individual organisms.

In the longer term, there is believed to be a sort of evolutionary "arms race", that also tends to promote a balance between predators and their prey. Selection ensures that the even improved ability to capture prey evolves in the predators hand in hand with the improved ability by the prey to avoid predation.

Competitive exclusion

The normal absence of very similar, extensively competing species in the same place seems to be due to the fact that when such a situation does occur, one of the species is bound to be at least very slightly superior to the other. The outcome is selection against the less effective species, which soon become extinct in that area. There is certainly no form of co-operation between the species to ensure reduced competition.

Symbiosis

The origin of symbiosis can be explained as cases where there is a net benefit to be obtained by the individuals of each respective species in the relationship, compared to non-symbiotic individuals. The sea anemone sitting on the hermit crab shell is fitter than a sea anemone not so carried around; the hermit crab carrying a sea anemone gets more food than a crab without one, and this more than outweighs any cost of carrying its passenger. Each is behaving in a manner that serves its own selfish interest.

Animal societies

The problem of explaining co-operative behaviour is particularly acute in those cases that do look like examples of extreme altruism in animals. A sterile worker bee produces no offspring itself, which is the very last kind of behaviour that would be expected to result from natural selection. Even a fully fertile animal that nevertheless reduces or abandons its own reproduction in order to assist the reproductive efforts of other members of its species ought to be selected against. It has often been proposed that what is happening is a phenomenon called group selection. A whole animal colony, such as a hive of bees or a troupe of monkeys may be selected in favour of other colonies, on the grounds that it is a more efficient colony because of the co-operation between its members. The difficulty with this kind of explanation is that it does not explain why non-co-operating individuals within the colony to not thrive, but are selected. A non-co-operator would gain the benefit of the activities of its associates, but not pay the cost in terms of reduced reproduction. Therefore it ought to do best, and to pass its non-co-operation behaviour to its offspring. In time, such non-co-operators would replace the reproductively less successful co-operating individuals.

A much better explanation for the evolution of altruistic, or co-operative behaviour is termed "kin selecting". Suppose an organism co-operates in such a way that its efforts increase the reproductive success of a close relative such as a sibling. Since close relatives share most of their inherited characteristics, having copies of largely the same genes, then to a large extent the co-operating individual will be effectively, if indirectly, reproducing its own kind. It may therefore be selected, particularly if its activities significantly increase the reproductive success of its close relatives. In this sense, the co-operating, altruistic individual is still behaving in a manner that serves its own "selfish" reproductive interest i.e. increasing the percentage representation of its own particular kind in future generations.

It has to be concluded that for all the appearance of co-operation, altruism, balance and harmony that occurs amongst the organisms and species on "bios", in actual fact each organism is selected on the basis of how successful t is as an individual. The outcome is a system where behaviour of organisms is predicated on "selfishness", even though co-operation is often the most effective way of expressing things.

IS "BIOS" STABLE?

If the apparently harmonious interrelationship of organisms arises by natural selection, with its essential focus upon self-interest of individual organisms, then it might be asked whether the system of "bios" is really very stable. What is seen is certainly an appearance of balance and permanence, but direct human observation of "bios" is only possible for an infinitesimally small length of time compared to the history of life. What seem to be stable relationships could actually be in the process of building up or breaking down. It is necessary to turn to the evidence of fossils for a knowledge of the longer-term nature of "bios".

What emerges is absolutely unequivocal. "Bios" is very unstable indeed. The fossil record indicates that all species are destined for extinction. The average mammal species, for example, only survives for some 2-3 million years from its origin to its final disappearance. At the same time as species are becoming extinct, new ones are arising to replace them. The reason is believed to be changes in the environment that are too rapid for selection to keep pace with. These changes may take place in the physical as well as in the biotic environment, i.e. the predators, parasites, prey, and competitors of a species. It certainly seems to be the case that species can be driven to extinction by over-predation, competition etc.

Occasionally the Earth's biota has suffered a period of greatly increased extinction. A large percentage of all species have gone extinct at about the same time. These periods are known as mass extinction, of which the most familiar is the one at the end of the Cretaceous Period, which saw the extinction of the dinosaurs among many other species. There is a great deal of debate about the causes of mass extinction, but what is clear is that they represent major collapses in the balance of "bios".

Therefore, the appearance of stability and permanence of "bios" is really a short-term illusion. The present devastation of the natural world by humans have undoubtedly accelerated the rate of degeneration of "bios", but there is no doubt that throughout the history of life on Earth, "bios" has already possessed its own inbuilt instabilities.

IS "BIOS" A SUITABLE MODEL FOR HUMAN SOCIETY?

From the point of view of the origin of evolution of the contemporary biological environment, it has to be concluded that "bios" is a result of the temporary, unstable and shifting balance of relationships between different organisms, each effectively pursuing its own self-interest. The moral question that leads from this scientific interpretation is whether "bios", as it actually is, offers an acceptable model for the design of human relationships and interactions. Taking it for grated that what is required of human society is indeed that which superficially "bios" seems, namely an integrated system in which self-interest of individuals and groups of individuals is subsumed by co-operative behaviour, then it would seem that the real "bios" actually has little to offer as a detailed analogy. Certainly, if the means to bring about human social harmony had to involve analogues of the kinds of evolutionary processes believed to operate in the natural world, this would surely be found completely unacceptable. Competing for resources, extinction of the less fit, giving only when the taking is greater, instability of the relationships between individuals and groups of individuals and so on, are hardly recipes for achieving the desired human situation. "Bios" does not constitute a morally suitable model for human society, and it is for humans to seek to devise more appropriate means for achieving the desired ends.

BIOS AS THE HUMAN ENVIRONMENT

The second general viewpoint of Biopolitics concerns "bios" as the environment in which humans exist and with which they interact in various ways. As with the first viewpoint, "bios" is a model for human organisation, so here, scientific questions can be partially disentangled from moral ones.

Scientific questions

The sorts of questions about the interrelationships of humans in the natural environment that are potentially amenable to strictly scientific analysis concern the physical and biological consequences of various human activities. They concern the ecological en evolutionary responses of species, including humans themselves, to particular perturbations of those species environments. For example, what actually happens when the habitat of a species is greatly reduced? Generally, the species cannot re-adapt in time before its rate of reproduction has declined to such a low level that extinction is virtually certain. Thus such activities as pollution and deforestation lead inevitably to extinction of numbers of species.

Another familiar activity is monocultural agriculture. This can have the effect of actually greatly increasing the size of the habitat of certain species i.e. pests. Here there may be an explosive increase in the population size of those species, with all kinds of consequential effects on further species.

There is also a rather special scientific question about the human habitat. Although in a natural environment, the excessive modification of the human species' habitat would be expected to lead to a decline in the human population, in fact technology can to a large, and ever-increasing, extent compensate for the loss of the natural resources. Any modern city illustrates this well, and scientifically speaking it seems likely that

humans could remain viable despite an even more massive alteration of their habitat. A totally artificial environment of concrete, plastic, and the use of synthetic organic resources and electrolytically generated oxygen, would still allow human life to exist, even in the absence of any other species. Indeed, such an existence might well enhance human life an physical well-being.

Moral questions

Understanding of the evolutionary and ecological details of the relationship between humans and "bios" is still rudimentary, but the answers to these scientific questions are potentially forthcoming. This still leaves untouched the moral question of what to do with the information. Why should "bios" be conserved, particularly if it does turn out to be true that humans do not need it for their existence? One common belief is deistic. "Bios" reflects God's creation and should be revered as an act of worship. Indeed, there is a view that humans were created specifically as custodians of the Creation. For those who accept such a metaphysical idea of existence, there is no problem at all in justifying the conservation of the natural world.

For many who cannot accept the deistic interpretation, there is a much greater problem in morally justifying the conservation of "bios". The humanist who sees humans as a species that arose by evolutionary processes no different from those that gave rise to other species, has to accept the likelihood that the processes involved selection on the basis of self-interest. Co-operation between individuals, and husbanding of natural resources would still be an expression of this individualism, and would be inherently unstable relationships. An individual who could behave in such a way as to gain more in the short term would be favoured, in so far as the behaviour was inherited, however disastrous this might be in the longer term. Yet conservation is a long term strategy.

Even accepting this view, there are several ways of trying to justify the conservation of "bios". There is an argument that technology might not be able to compensate for the loss of all the natural human resources, although the recent history of biotechnology does suggest that this is not the case. A more convincing argument is aesthetic. Humans evolved within a relatively undisturbed "bios". It may wee be that there is a psychological need for each individual to continue to dwell within, or at least within range of, an environment that is as similar to the original environment as possible. The more artificial the habitat, the greater the psychological stress the individual suffers, to his general detriment. This would account for the otherwise rather irrational "love of nature" that the majority of individual humans would express.

Weather these, or other arguments are valid is one of the most critical questions facing present-day conservationists, and as yet the answer is far from clear.

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