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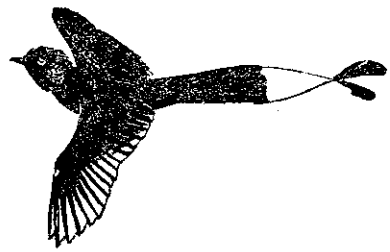

CULTURE, PERCEPTIONS AND ATTITUDES TO THE ENVIRONMENT

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1. INTRODUCTION

1.1 Ecological Prudence: Homo sapiens is an animal unique in many ways. With use of tools, symbolic language and cultural transmission of information, it has acquired an unprecedented level of control over its environment. It is also the only species definitely known to display ecological prudence, i.e., restraint in resource use that ensures availability of the resource at a higher level in the long run (Gadgil, 1985a). Such prudent behaviour is however not universal; a number of human groups utilize many resources at their disposal in a profligate fashion. This uneven incidence of ecological prudence, in time, in space and in respect to different kinds of resources is clearly amongst the most intriguing questions facing the student of human behaviour; it is also a question of vital practical import.

1.2 Cultural transmission: Patterns of resource use adopted by human groups are affected by earlier patterns of resource use by those groups, as well as by other groups with whom they are in contact. In other words, patterns of resource use are conditioned by culture, which we define here as patterns of behaviour that spread through a process of learning from other members of the population (Bonner, 1980; Cavalli-Sforza and Feldman, 1981; Boyd and Richerson, 1984). It is evidently such cultural patterns of behaviour that enable human groups to act beyond immediate biological needs of survival and reproduction and sometimes permit them to refrain from immediate use of resources in long term interests of the group.

What, then, are the forces that mould these culturally prescribed patterns of behaviour? There is a wide divergence of opinions on this

issue, ranging from the position that cultural behaviour is totally free of biological constraints, to the belief that it takes forms which enable individuals to maximise their genetic fitness (Alexander, 1979; Sahlins, 1977). We adopt here the syncretic position taken by Boyd and Richerson (1984) who argue that while cultural behaviour will not necessarily help maximise individual genetic fitness, it will be conditioned by certain broad genetically prescribed tendencies. These would undoubtedly include a propensity to pursue selfish interests. However in addition, they suggest that selection at the level of groups must have played a significant role in moulding man's innate tendencies and therefore group loyalty, tendency to conform to behaviour patterns of other group members, as well as antipathy towards interests of other human groups may be part of our genetically prescribed bias. It is also plausible that willingness to establish bonds of co-operation based on reciprocity would be a part of man's innate genetic tendencies (Axelrod, 1983).

So far, these suggestions as to innate tendencies are merely based on theoretical arguments and anecdotal evidence; there is no firm empirical basis for any of them. Nonetheless, they are highly plausible and provide us with a very useful framework within which to explore human cultural behaviour. As an evolutionary biologist, I am naturally attracted by this framework and in this essay propose to develop it further to explore human cultures, perceptions and attitudes to the environment. I would be especially concerned with one particular expression of these perceptions, namely the World Conservation Strategy.

2. SOCIAL ORGANIZATION

2.1 A hierarchy of groups: Much of the resource related behaviour of human beings is a part of their organised social activity. In other words, humans deal with resources of their environment in groups of variable size and composition, ranging from nuclear families and hunting bands of adult males to nation states and multinational corporations. The patterns of resource use adopted by them may then be expected to reflect the tendency to further the interest of their own group, and be indifferent to or even inimical to the interests of alien groups. Restrained use of a resource would serve the interests of a group provided that the higher levels of resources at a later time rendered possible by such restraint benefit the group concerned. This would happen if that particular group continues to depend on the use of that resource at the later time, and if other groups are unlikely to usurp the benefits of its prudence. On the other hand, profligate use of a resource would serve the interests of a group if any restraint is unlikely to benefit that group in the future, but may, on the other hand, benefit groups that are in competition with it.

We suggest that individual human beings, as well as human beings acting in groups do perceive group interests in this fashion and that these perceptions in turn affect their attitudes towards environmental resources. Any human being will at once be part of human groups at a number of different levels ranging from a family to a tribe or a caste, to a professional group, to a corporation or a nation state, or even the entire biosphere. The interests of these various groups may

often diverge. The relative weightage that an individual may attach to the divergent interests of groups that he is a part of must depend on the extent to which he shares in the benefits accrued to the group concerned. An individual will therefore strongly identify with interests of a relatively homogeneous group whose well being benefits him, but do so much less in case of a heterogeneous group whose well being benefits but little. Further, an individual will identify as alien a group in whose well being he does not share at all. We may then expect any individual to perceive as proper the prudent use of resources when such prudence benefits a group with which he has a strong commonality of interest; but profligate use of resources as proper when prudence will only benefit other groups with whom he has little commonality of interests.

2.2 Perceptions and culture: While perceptions and attitudes may respond rapidly to interests of an individual as a member of groups at different levels, culturally determined patterns of behaviour would respond somewhat differently. This is because such behaviour patterns are based on an integration of the conditions over longer time periods and over a large number of individuals. Hence, culture would be influenced strongly by the earlier history of the groups as well as by interests of the more dominant groups within the society. The emergent behaviour of any individual would be an outcome of the prevalent culture, as well as his individual perceptions.

2.3 Commonality of interests: Consider a specific resource, for instance the population of blue whales in the world oceans, a particular stand of forest in the middle Himalayas or the water flowing in a stream in Kenya. Consider such a resource over a

reasonably long time scale from the point of view of human species, say a few generations. We can then think of the set of individuals that will have some access to and some measure of control over any given resource over such an extended time scale. We suggest that these individuals would perceive as proper prudent use of such a resource only if all of them possess a broad commonality of interests. On the other hand, if they strongly diverge in their interests, they would tend to consider profligate resource use as proper. Such perceptions would get translated into elements of cultural patterns of behaviour if they persist over a sufficient length of time and especially if they are parts of perceptions of the dominant groups within the society.

3. INSTITUTIONALIZING RESOURCE USE

3.1 Idiom of rituals: Human cultures have come up with a variety of devices to institutionalize either prudent or profligate practices of resource use. These employ three kinds of idiom; of ritual, custom and codified knowledge. Of these, the idiom of ritual is the oldest and based in a model of nature that treats hills and rivers, trees and snakes as creatures with which the humans are bound in a social relationship. Since most of the positive human relationships are woven out of ties of kinship or reciprocity, these objects too are treated either as kin, especially as mothers, or organisms in a mutualistic relationship. In this idiom they are offered gifts of value to the humans, the sacrifices, or are promised protection from excessive harm at the hands of humans. Thus traditionally in India, the Peepal tree (Ficus religiosa) is never cut, nor any cobra killed, no fishing

allowed in sacred ponds, no breeding heron, stork or crane disturbed or poisoning of rivers for fishing restricted to a few ritual occasions. Such restrictions, likely to have arisen during the hunting gathering time, have undoubtedly contributed towards sustainable resource use (Gadgil, 1985b).

3.2 Idiom of customs: The more complex societies of the agricultural pastoral times retained a number of such ritual restraints on resource use, they added others in the idiom of custom; i.e., an agreed upon pattern of behaviour within relatively small social groups. Thus, there are two communities of basket weavers in Western Maharashtra; Kaikadis and Makadwallas. Of these, the former use only bamboo and the latter only the palm leaves. Of these endogamous groups of nomadic hunters in the same region, only Phasepardhis snare blackbuck and deer, Vaidus concentrate on trapping small carnivores, while Nandiwallas go in for wild pigs and monitor lizards. In consequence, traditionally, Phasepardhis had a monopoly over blackbuck populations of a certain region. They report that they also had the custom of releasing any fawns or pregnant does that they snared, a practice that undoubtedly helped maintain the blackbuck populations (Gadgil and Malhotra, 1983).

Ritual and custom were also undoubtedly turned towards decimation of resources as well as their sustainable use. Thus the Indian epic Mahabharatha, dated around 1000 B.C., describes an episode in which an entire forest on the bank of Yamuna was burnt to appease the fire god, Agni, with those offering this sacrifice driving back every animal and tribal that attempted to escape from the burning forest. This is

perhaps a real life episode depicting the struggle between forest dwelling hunter gatherers and agricultural/pastoral people for land, with the latter justifying themselves in the idiom of a ritual sacrifice to the fire god (Gadgil, in press). Christianity too attacked nature worship and taboos that went with it, cutting down sacred groves of oak trees to construct churches in their place. The nineteenth century custom of wearing plumes of egrets in the hats of women, or the still persistent custom of wearing coats of skins of wild mammals, or the demand for the rhino horn as a supposed aphrodisiac provide striking examples of customs responsible for decimation of resources.

3.3 Codification: Codification of resource use must have begun with urbanization when demands of trade and taxation introduced measurement and recording. An early example of codified resource use is the setting aside of special elephant forests prescribed in Kautilya's Arthasasthra, a third century B.C. manual of statecraft from India (Kangle, 1969). Elephants were captured from such forests for use in the armies by the king. There was to be no other capture or killing of elephants which attracted capital punishment. Application of codified knowledge for regulating resource use has really come into its own since the rise of modern science, with issues addressed to ranging from maximal sustainable yields from exploited fish populations to the destruction of life on earth following a nuclear war. Again such codified knowledge has been harnessed to promote prudent as well as exhaustive use of resources.

4. PATTERNS OF HISTORY

4.1 Hunter gatherers: There have been dramatic changes in the patterns of resource use as well as in social organization of the human species over the historical period. For much of its history, human species was organized in the form of territorial tribal groups of hunter-gatherers using the environmental resources at a relatively low intensity. At this stage, the members of a territorial tribe controlling resources over a territory possessed strong commonality of interests. This, as suggested above, should have favoured prudent resource use. Such prudent use was institutionalized through various ritual restraints on resource use, and probably permitted these societies to remain in equilibrium with their resource base over tens of thousands of years.

4.2 Farming societies: With the introduction of cultivation of plants and domestication of animals, human societies substantially stepped up their intensity of resource use. Simultaneously they became much more heterogeneous. The ruling that emerged in these societies claimed control over resources of rather wide terrain. The response was two-fold. Smaller, even more homogeneous groups such as nuclear families now controlled resources over restricted area such as individual farms. The control of resources of the uncultivated land and waters, on the other hand, came to vest in a much larger, more heterogeneous group of people. While the farms may therefore come to be managed with considerable prudence, the resources of the commons may have been managed in a profligate fashion. This is perhaps reflected in the rise of religions such as Christianity and Islam that debunked nature worship and the prudent use of resources that probably went with it.

4.3 Indian caste society: The Indian agricultural/pastoral society provided a rather different response to the complexities of resource use. Here the society remained organized in a number of tribe-like endogamous groups, the castes. The caste society so regulated resource use that each group tended to acquire monopoly over certain resources of a specific locality; for instance, Phasepardhis over blackbuck or Kaikadis over bamboos of Western Maharashtra as described above. Furthermore, the different caste groups living in a village tended to retain common interests in good use of resource of their locality due to a variety of arrangements for resource sharing, in spite of the highly inegalitarian nature of the caste society. The human society therefore had elaborated a whole system of rituals and customs permitting prudent resource use till the impact of British colonialism.

4.4 Conquest of nature: The European society, on the other hand, had discarded the ritual system of prudent use, and did not elaborate any system of social customs promoting prudence. Consequently, this society developed an ethic of man being free to conquer nature and use resources as he wants, an ethic has been traced to the stoic tradition of Greeks through at least one thread of early Christian tradition to Protestantism'(Passmore, 1977). The response of the European society to the gradual exhaustion of its resource base was development of codified knowledge- science and technology- that permitted more intensive and effective use of resources. It also permitted substitution of new resources for old ones getting exhausted, for instance, coal and wood in smelting of iron. These technical advances further reduced expectation of benefit from sustainable resource use

and prompted the ethic of profligate resource use, so characteristic of the European age of expansion from the 17th to 19th centuries.

4.5 Science and prudence: The latter half 19th century witnessed a maturation of scientific understanding in the European civilization. It also witnessed the emergence of more egalitarian societies in the Western world. This meant that the larger human groups controlling resources within the European nations now had a much greater commonality of interests. This catalysed the emergence of the modern science- based conservation movement, first in Switzerland, then so much ravaged by deforestation and landslides, and then in other parts of Europe and the Americas (Thomas, 1956).

4.6 Rape of the colonies: The practices of prudent use of resources grounded in the scientific understanding that thus emerged in the Western civilization during the late 19th and early 20th century, were however not applied to other parts of the world that were under direct or indirect control of the West. For the Western control over resources of these parts of the earth was relatively new, and apparently temporary. Furthermore, there was little commonality of interests between the indigenous populations of the third world and their colonial or neo-colonial masters. The result, for instance, has been that while the Japanese and the Americans have maintained an excellent forest cover over their native lands, they have little concern over liquidation of forest cover in Southeast Asia or Latin America. A similar scenario holds within a country such as India which has absorbed much of Western science and technology. There is little commonality of interests between the group of people that benefit from

the country's forest based industries and the rural and tribal population traditionally controlling and still largely dependent upon forest resources. The result is non-sustainable use of forest resources by both these segments of the society, despite the supposedly scientific management of forests that is believed to be in operation.

5. EMERGING INSIGHTS

5.1 World conservation strategy: There is however now emerging a greater commonality of interests in the human population of the world as a whole. This has its origin in the scientific awareness that is happening in one part of the world is bound to affect all others in the long run. I believe that the World conservation strategy (WCS), the focus of this conference is one of the consequences of this awareness. It naturally emphasizes the interconnectedness of the ecological systems and the need for a common approach towards the prudent use of resources the world over. It draws attention to the value of biological diversity, and in a sense to the need to recapture the feeling of a mutualistic relationship with other living creatures that underlay the practices of nature worship in the primitive times. Clearly the WCS is an imporatant step towards generating a new culture of prudent resource use the world over.

5.2 Managing living resources: The World conservation strategy adopts an essentially managerial approach. It argues that in the common long term interests of humanity we must be concerned with maintenance of essential ecological processes and life support systems, with preservation of genetic diversity and with sustainability of

utilization of species and ecosystems. It then lists the major obstacles to achieving these objectives, not in terms of the social and economic order and the perceptions and policies that flow from it, but rather in terms of managerial limitations due to lack of proper appreciation and information relating to the issues involved. It goes on to suggest how we could manage ecosystems and genetic diversity by developing the proper policy, legislative and technical tools. In many ways the WCS extends the sustained yield fisheries management approach to much broader concerns.

5.3 Moulding cultures: While this is an exercise of tremendous value, it does not adequately address itself to the question of how the different segments of the world community perceive the use of the natural resources, how these perceptions relate to their cultures and in turn how they determine the priorities and policies of concern to WCS. In this context, we may pose two broad questions:

(a) How do we build up on the existing elements of perception and culture that are supportive to the goals of WCS?, and

(b) How do we overcome the change the elements of perception and culture that are antagonistic to the goals of WCS?

6. A NEW CULTURE

6.1 Kinship of creatures: Amongst the mankind's most positive cultural heritage is the feeling of kinship, or at least ties of mutual interest with other living organisms. Such an attitude is widely encountered amongst the primitive cultures and must have prevailed throughout the long history of man as a hunter-gatherer. It provided

the rationale for a whole spectrum of cultural traditions of restrained use of living organisms. Many cultures, including that of India have retained at least some elements of this attitude. Thus, a majority of Indians believe in rebirth and passage of the soul through a whole series of other organisms. Incidentally this number is given as 8.4 million, a figure remarkably close to the current estimates of the total number of biological species. they also worship trees, especially those belonging to the genus Ficus, snakes, peafowl, elephants and monkeys. Again, it is notable that Ficus is now considered a keystone resource for the conservation of a whole series of other species by the tropical ecologists. Another tree considered sacred is Prosopis cineraria in parts of Indian desert. This is economically the most valuable of desert trees, although rather slow growing. Its preservation is therefore a great boon to the desert dwellers who eat its pods, feed the podds and leaves to their animals, use the thorns to fence their fields and use the wood for fuel construction.

6.2 Scientific rationale: This attitude of kinship or mutualism towards other living creatures was rejected by a dominant school of Christian thought, setting man apart from the other creation. This is why the notions of evolution have been so abhorrent to the Christian dogma. Our modern scientific understanding evidently takes us closer to the more primitive position. Human species is as much a product of three billion years of evolution on the earth as all other living organisms, and shares much with them. In fact, one estimate puts the homology of the chimpanzee genome with that of human species at as high as 96%. The science of ecology also tells us that man is a part

of the web of life, and very much dependent on it. This understanding has promoted a vigorous debate on rights of other species in the western world (Ehrenfeld, 1978).

Evidently, this perception of biological kinship of man with other species of living organisms, and their interdepenence must become a common element of mankind's perceptions. I believe that such a perception should be incorporated in the idiom of science and not of ritual at all, for the ritual in the idiom veneration and ritual protection of living creatures as an element of culture is fast vanishing everywhere. This is certainly my experience in India. On the hill range of Western Ghats of peninsular India the natural vegetation has largely disappeared in its climax forms, except here and there in small pockets as sacred groves. I have been involved over a decade in attempts to identify such pockets and protect them (Gadgil and Vartak, 1975; 1981). This exercise has revealed that in many parts the local people realize the practical value of these groves for protection of catchments of streams, as reservoirs of sources of plant medicines and so on, and often would like to protect them. The forest managers often however view these as stands of overmature timber, and the merchants as sources of profit. In this complex situation, a majority of local people no longer perceive these groves as something to be protected as sacred, and have joined the merchants in exploiting them. While quite a few still persist and are protected, this element of culture is clearly bound to vanish in the next decade or two. The sacred groves could be protected in the long run only if the society comes to value them as reservoirs of genetic diversity that they are and offers economic incentives to the local population to protect them.

6.3 Need for the new idiom: In fact, any attempt to perpetuate ritually based protection to living creatures is not only impractical, but may have negative implications as well. For Indians have not only preserved sacred groves or grand trees of banyan (Ficus bengalensis), they have also permitted the cattle population to explode at least in part, because of our veneration for it. Over-grazing by these cattle has serious consequences over vast areas which have come to be dominated by a few unpalatable species like the exotic weed Parthenium. One must therefore attempt not to perpetuate respect for other living creatures in its old idiom, but aim at preserving the desirable attitudes and practices suitably rationalized in the modern scientific idiom.

6.4 Towards a new social order: Not only should the WCS address itself to the question of how to build upon perceptions and cultural elements supportive of its aims, but on how to overcome elements antagonistic to its objectives. As argued above, I believe that the main cause underlying all such antagonistic perceptions is the absence of commonality of llong term interests amongst the set of people controlling most of the world's resources today. This has two fold causes; firstly the growing disoarities within societies and between nations, and secondly technological progress that has permitted a small elite to acquire a hold over resources of much of the earth. One appraoch therefore could be restoration of control over resources to a small, largely homogeneous local community. This is the approach advocated by Mahatma Gandhi, and attempted to be put into practice by some of his followers. A notable example of such an attempt is that of Chandi Prasad Bhatt, a leader if Chipko movement in the Himalayas.

Chandi Prasad has organized village after village in the Alaknanda valley to manage their own resources prudently. It is however, an uphill task, for the powerful commercial and bureaucratic interests continually attempt to sabotage in any such attempt, and his success has therefore been limited (Agarwal,etal., 1982).

The real solution has to come from a new genuinely egalitarian social order, within nation states, as well as between them. Only then can commonality of long-term interests prevail on a global scale, and only then will there evolve a world wide human culture truly sympathetic to the objectives of the WCS.

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