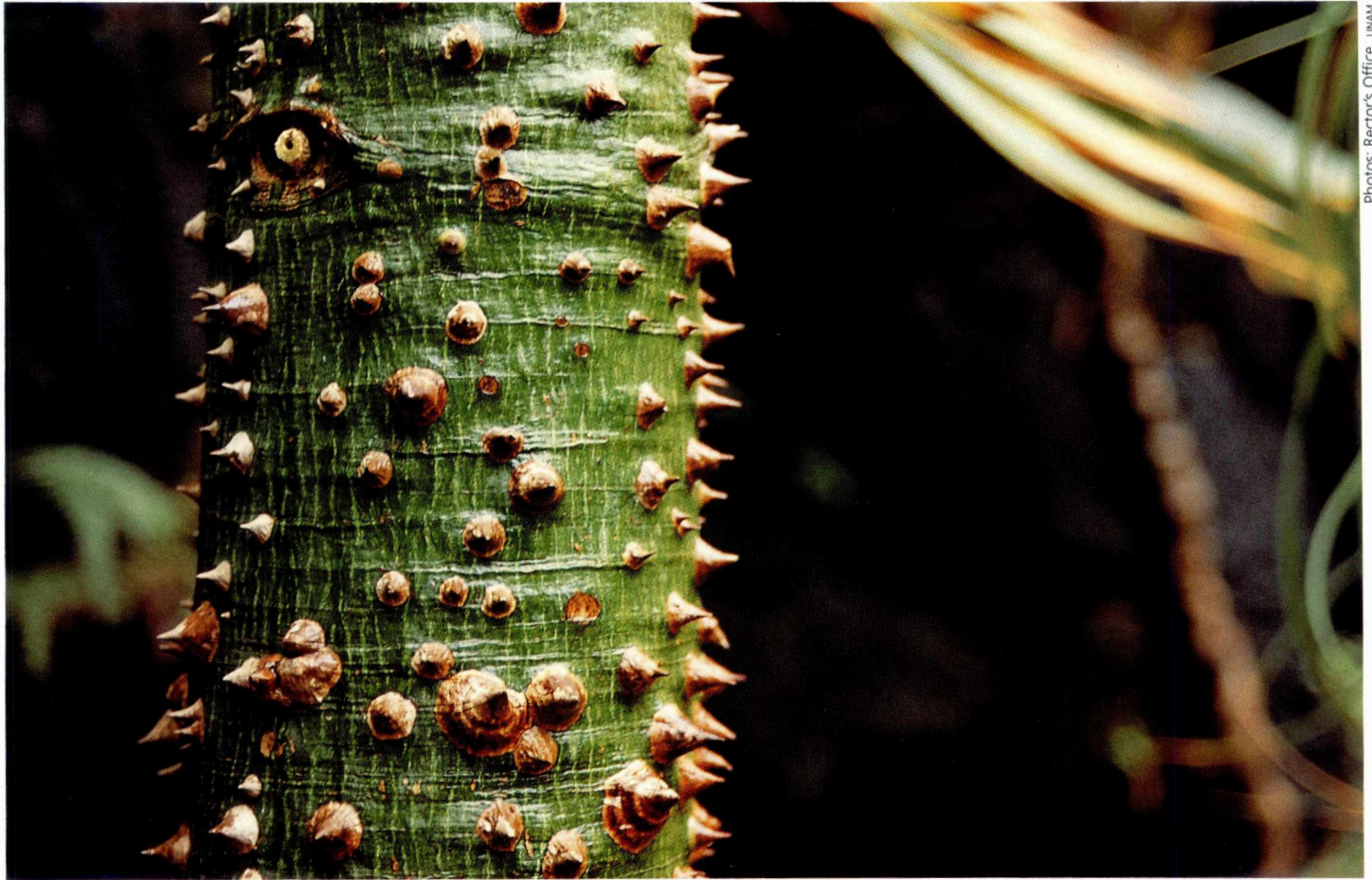


SCIENCE,
SOCIETY AND
ENVIRONMENTAL
ETHICS

ECOLOGY

*José Sarukhán**

* Rector of the UNAM.



Photos: Rector's Office, UNAM

Science moves in the paradoxical context of promoting human and social development and at the same time protecting the environment.

Edward O. Wilson, in his beautiful book *Biofilia*, mentions that when very little is known about an important topic, the first questions people ask about it are almost invariably ethical. As knowledge of the topic grows, people become more concerned with information; their questions are more specific and, therefore the field of vision becomes intellectually narrower. Finally, when the subject is almost completely understood, questions return to ethics. The concerns about the protection of the environment are now in transition from the first to the second phase and, as Wilson expects, should proceed directly to the last phase.

An example of this kind of analytical exercise, involving scientists from many disciplines, including a few philosophers, was the giant environmental meeting in Rio de Janeiro in mid-1992.

Another particularly interesting meeting was the scene of a lively debate among French scientists, and ended

with the drafting of a text known as the “Heidelberg Call.” In my opinion, this illustrated very clearly the kind of problems that science, ethics and society are facing and will have to solve regarding the well-being and development of society, its impact on the environment, the effects of environmental changes on society itself, the ethics of applying different kinds of scientific knowledge in the context of the paradox between human and social well-being and development and the conservation of the environment and the effects of changes in the latter on the human race.

This meeting, organized by researchers from the Cancer Research Institute in Heidelberg, to discuss problems in evaluating scientific generation of dangerous and carcinogenic substances, actually ended up looking at another, broader gamut of concerns, such as the tendency for national governments and some international organizations to protect the Earth from the “evils of Man and progress.” The call



Ecology must be exclusively and strictly scientific or not exist at all.

opposes the emergence of an ideology that is “irrationalist,” opposed to scientific and industrial progress. It emphasizes that humanity has always progressed by putting nature at its service and warns the authorities responsible for the fate of our planet against any decision based on pseudo-scientific arguments. It concludes that ecology must be exclusively and strictly scientific or not exist at all.

This Heidelberg Call to the world’s heads of state and government makes some very salient points, as well as some truly dangerous ones. The beginning and ending passages of the call are very appealing. The beginning expresses the wish of the scientists who wrote it to “make our maximum contribution to the preservation of our common heritage, the Earth.”

The final sentences are also extremely attractive and acceptable:

We draw the attention of everyone to the absolute need of helping poor countries reach sustainable development com-

parable to that of the rest of the planet, protecting them from the problems and dangers generated in the developed nations and not letting them get bogged down in the maze of unrealistic obligations that could affect both their independence and their dignity. The greatest evils threatening our Earth are ignorance and oppression, not science, technology and industry, the instruments of which, when managed appropriately, are indispensable tools for a future built by humanity itself, for itself, which may overcome the really big problems like overpopulation, hunger and disease throughout the world.

Up to this point, the call and these scientists’ vision of environmental problems is correct. However, numerous problems and questions emerge which sometimes allow us to see this call as a relatively naive position that creates confusion between industrial growth, increased profits and a higher gross national product on the one hand, and greater human development expressed in terms of the satis-

faction of basic needs such as subsistence, education, culture and well-being, on the other. Clearly all these qualities are not necessarily synonymous, and neither is it a good idea to confuse scientific progress (understood as knowledge of humanity) and industrial progress.

Finally, some of the expressions used in the Heidelberg Call seem to indicate an idealized conception of nature, the belief in a nature which does not really exist, where progress would apparently be linear and in which all of its consequences would be beneficial for the human species.

The following is an example of a passage in which this kind of statement appears:

We sustain that a “natural state,” sometimes idealized by backward-looking movements, does not exist and probably has never existed since Man appeared in the biosphere, given that humanity has always progressed by increasingly subjecting nature to its needs and not vice versa.

We underline that many of Man’s essential activities are carried out through the manipulation of dangerous substances or near them, and that progress and development have always involved increasing control over hostile forces for the benefit of humanity.

It goes without saying that one of the important aspects of this Heidelberg Call is the warning not to use pseudo-scientific knowledge as a cornerstone of our thinking, as do many environmentalist groups, and even some people



True conservationism must be based on both trustworthy data and ethics.

who work in the science of ecology, who use this kind of intimidating information to “denounce” the dangers of certain human activities.

Naturally, I concur wholeheartedly with this, and I personally, as an ecologist who has worked on aspects of fundamental research in this science, cannot but be totally supportive of this position.

However, it is very clear that we are confronted here with a paradox: the nature of the problems and phenomena we are facing—with regard to the interaction between Man and his environment—is notoriously different from that of other disciplines, both in the field of biology itself and in physics or chemistry.

I mean that phenomena

in molecular biology or molecular genetics, or even in physics and chemistry, are simpler and more predictable. The nature of the interaction of ecological phenomena is infinitely more complex and fundamentally unknown and therefore imposes a scenario in which conclusions which would be perfectly valid in other areas of science cannot be drawn.

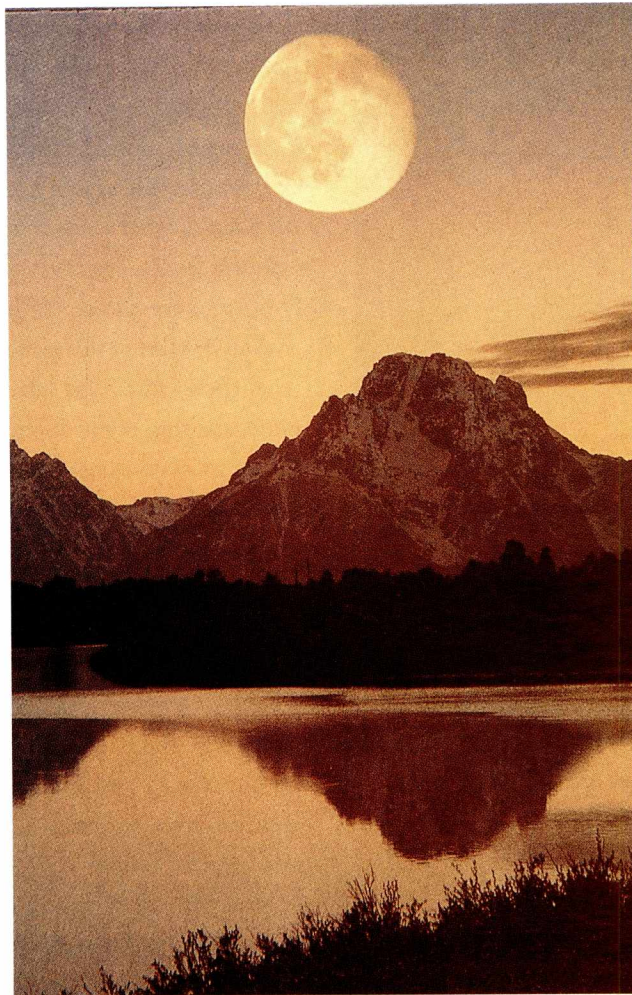
The future of a true conservationist movement, based on the scientific understanding of these phenomena, depends not only on concrete, firm and trustworthy data about the phenomena, but also an advance in its moral reasoning. Its maturity is dependent upon and linked to biology and a new field, bioethics, which deals with different technological advances which today are possible due to steps forward in biology. Numerous philosophers and scientists are developing a more formal analysis of such

complex problems as how to decide who should receive organs for transplant, the justification of heroic—and extremely expensive—measures for prolonging life and the possible use of genetic engineering to alter characteristics of human breeding (inheritance, genetic development). These specialists have only just begun with similar rigor their considerations about the relations between human beings and the organisms which surround us.

The pioneer ecologist and conservationist Aldo S. Leopold, a great student of Mexico's fauna, defined ethics as, "The series of rules that Man invents to face new or complex circumstances, or which involve answers so far off in the

future that a common, ordinary person cannot clearly predict the outcome of those circumstances." From this we can deduce that ethics will be all the more solid if they can successfully deal with the distant future. This is particularly true for the ecological problems facing Man, problems too complicated to be understood solely through intuition, common sense or even partial—albeit scientifically solid—information.

In the context of the ecological conundrum, we find a singular paradox: its values depend on time and it is very difficult to make them lasting. We want health, safety, freedom and personal and family well-being. Undoubtedly, we project this wish for future generations, but not necessarily with the same firmness with which we desire it for our own, and, of course, as long as it does not imply a high personal cost.



Creating awareness of the significance of posterity is vital for protecting the environment.

The great difficulty that environmental ethics face is that natural selection has programed human beings to think in terms of a temporary, physiological definition. Our mind travels basically in dimensions measurable in hours, years, at the most a few generations. The kind of problems we are facing in ecology, particularly at the regional and global level, are such that it is very difficult for people to be seriously concerned about them and to take decisive, even violent, action. Global warming, the deterioration of the quality of the air or the disappearance of hundreds and thousands of species are not of a nature to become quickly perceived as questions that should receive a great deal

of attention from those they affect. As Wilson said, "Ecological and evolutionary time, covering centuries and millennia, can only be conceived intellectually, but it is doubtful they will have any immediate emotional impact."

Only through an extraordinary educational effort and much reflection will people generate emotional responses to situations which are very remote, both time-wise and geographically, and therefore place more value on the significance of posterity.

In another beautiful passage from his book *The Ethics of Conservation*, as part of an "environmental ethic," Wilson says, "I have argued in this book that we are human, to a great extent due to the very particular way in which we associate with other organisms. They are the matrix out of which the human mind originated and in which it is permanently rooted."



Humanity has usually progressed by putting nature at its service.

Why, then, the resistance to developing an ethic of conservation? The usual argument is that people should come first. This is a strong argument and difficult to refute. However, we should ask ourselves: what is left, even after we have solved all the practical problems of individuals and societies? What is the object of reaching personal goals or social development and the realization of individual capabilities? What is the object of the development and evolution of human potential?

The wish to perpetually expand the development of society and personal freedom is clearly inherent to the human spirit. But, to sustain that expansion, we need the most careful, delicate and wise guidance and leadership of the living world in which we function. Expansion and the direction it takes do not necessarily have to conflict. The depth of the ethics of conservation should be measured by the degree to which these two aspects of nature combine and reinforce each other. This paradox can be resolved by using a more appropriate premise: the survival and the protection of the human spirit forever.

It is useful at this point to reflect, albeit briefly, on ethics. The ethics of science are such that their exercise in scientific activity becomes a school of ethics or morality, which, in the words of Mario Bunge, reinforces the following habits or attributes: 1) *Intellectual honesty*, which usually demands 2) *Independent judgement*, which frequently requires 3) *Intellectual courage*, which normally implies the criticism and self criticism which inspire 4)

Love for intellectual freedom, which leads to 5) *A sense of justice*, which is careful to take into account the rights and opinions of one's fellows.

In my opinion, these attributes, generated in the exercise of scientific activity, may be so important that they even mold other characteristics—above and beyond the research itself—related to scientists' personal and family life and the social relations.

And it is just at this point where the discussion about an "ecological ethic" and Man's actions and decisions in his understanding of the different aspects of his relationship to nature must converge with the prediction of the situations which one might call "political" in the best sense of the word.

WOMEN AND THE ENVIRONMENT

For better or for worse, human beings have continually molded their environment, as part of evolution. The domestication of countless plants and animals, each with its own genetic variety, is proof of the beneficial interaction of Man with other organisms. Nature itself, of course, continues to evolve, molding humanity. It is widely known that the cultural characteristics of different societies are the product of their interaction with their environment. This is so much the case that the oldest and richest cultures arose consciously in the areas of greatest biological diversity in the world. The fight for survival in a given environment indelibly marks a culture, giving rise to countless cultural forms, including everything from the social structure itself, the diet and language, to soil-use technologies and a particular cosmogony.

However, one of the elements of this continual interaction between society and nature—greatly ignored, little studied and understood, but which may have a fundamental role in the development, the practical ability and even in creating an ethics of the relationship of societies to Man—is the role played by women in the environment and in the biological diversity that surrounds societies. A group of researchers examined women's role in the environment and in maintaining biodiversity at a world meeting of the World Resources Institute, with

the aim of analyzing and developing an international strategy to protect biological diversity. This analysis fits in with the reflections on the role that women play in family development, in educating children and, finally, in the level of development of a given society.

It is well known that the only factor to which the birth rate can be linked is the level of education of women in each society. Many analyses, carried out at different educational levels, make this very clear. For example, at our National University students' academic performance clearly tends to have a direct correlation to the amount of schooling that their mothers had.

Also, in most developing countries, women bear the primary responsibility for the production and reproduction of food, medicine, fuel and domestic materials and for generating income for such items as schools, education, health and other family necessities. When the development plans of a country do not take into account women's role and contributions, they lead not only to biotic impoverishment, but also to human impoverishment. It is increasingly clear that, unless governments and their development planners explicitly take into consideration poverty, social inequality and gender problems, efforts to maintain environmental balance, and particularly protection of the biological wealth of the planet, will be practically in vain.

One of the findings of the World Resources Institute meeting was that women's cultural experience, and not their biology, is what makes them particularly adapted to the tasks of conservation. This is exemplified with the activities of a typical woman in India. She works from 12 to 15 hours a day collecting firewood and water, producing in the fields, collecting fodder for and taking care of animals, cooking, cleaning and looking after children and old people. Her relationship with the environment is very intense. The knowledge of Indian women—and those of many other countries—about medicinal plants, for example, is particularly rich and important for family health.

Once again, the most serious problem facing humanity regarding its future relations with the environment is reaching sustainable social, economic and cultural development. And this requires a relationship with an environment that is stable, appropriate and sustainable for long-

term human needs. Making sustainable development a reality is absolutely crucial for reducing the negative effects of human activity on the environment: from the profound transformation of essential inputs for human life (water, air, soil) to ending the extinction of thousands of species which are options for human use and basic elements in the maintenance of stable and viable ecosystems.

But development is not possible without women's full participation. Rural women all over the planet, particularly in the developing regions, and mainly urban women in developed countries, play a vital role both in the conservation of biodiversity and in the potential for perceiving and creating awareness about environmental problems that affect the health and the lives of families and societies. Unless women's many roles as deciding factors in family and community unity and well-being in broad areas of the world are clearly recognized and appropriately valued and their participation in decision-making increased, the environment, the world's biological wealth and human well-being will decline quickly in coming decades.

The debate about an environmental ethic will be possible to evaluate insofar as the cultural aspects underlying the different points of view become more explicit. This is the only way to better understand the challenge of Man's innate desire to progress and better himself for individual and social well-being when faced with an environment which, profoundly modified by that progress, paradoxically becomes the most serious obstacle to the just and egalitarian development of the members of a society. ❧



Making sustainable development a reality is absolutely crucial.