

## CULTURE AND SCIENCE

LOURDES ARIZPE

The concept of culture, in its current use, has been placed, in different periods and disciplines, *above* science, *in opposition* to science and *within* science. It is this polyvalence in meaning that makes 'culture' such a sensitive, valued yet sometimes contentious idea.

At the end of the 19<sup>th</sup> century, in the initial stages of scientific anthropological discovery, the term culture was to establish a basic epistemological distinction between natural events and human experience. Culture, in this very broad sense, was defined as 'everything that human beings have created'. This definition, *ipso facto* would include science, as well as all other belief systems and institutions of human society. Such a viewpoint locates culture *above* science, the latter being understood as the human activity that explains the natural world through a humanly intelligible discourse.

On the basis of this definition a heuristic opposition was established between 'nature and culture' which led to the classical demarcation that separated the natural sciences from the social sciences and humanities. It led to C.P. Snow's famous title to his book *The Two Cultures* referring precisely to the difficulties of bringing together the discourse of these two domains. In his book, published in the 1950s, he pointed at what seemed at the time a careening divergence between these two domains which made it difficult to advance towards an integrated, comprehensive understanding of a world made up of both natural and social phenomena.

### *Nature or Culture?*

In the second half of the 20<sup>th</sup> century, however, the old debate of whether nature – understood basically as genetics – or culture determined human nature has been all but resolved. It has by examining the cases of

the 'wolf children', that is, children who for some reason have grown up in the wild, isolated from all human contacts. It was seen that they could develop a few basic skills such as tool-making, refuge building and so on, and even a primary form of linguistic communication. However, they were unable to advance further in manual or conceptual sophistication. That is, they had lost what it was assumed they had initially, that is, genetically transmitted potentialities for acquiring knowledge, and developing manual skills and complex social abilities. Thus, the current accepted idea is that genetic inheritance provides specific possibilities for individual development which the cultural environment may either help develop to its highest degree or, on the contrary, stunt and underdevelop.

A more recent discovery which has confirmed such results are studies of the order of birth of siblings. For the sake of argument let us assume that siblings descended from one couple have exact or very similar genetic structures – granted, it is a momentous assumption – and hence, potentialities for personal development. Recent studies have shown that, even so, the psychological traits, specific skills, social and even political attitudes that each sibling develops may be very different. This has to do with the role that each sibling is assigned according to their birth order. This is why in many cultures there are different terminological concepts that differentiate siblings in this respect, for example 'primogeniture' in Indo-European cultures, or 'xocoyotl', the youngest son, in the Aztec culture.

The eldest son or daughter are expected to give continuity to family traditions, to be an example of respect, responsibility and emotional stability towards their younger siblings and so, in society they tend to be stable, conservative citizens and to reject change. The youngest sibling, in contrast, tends to be less disciplined, freer to explore emotional and imaginative experiences and so, in society, they tend to be artists and rebels.

Interestingly, a significant correlation has been found showing that 80% of gold medal Olympic athletes are first-born. Clearly, the physical investment of the mother in the first-born, assuming it is at its optimum, would give such children a greater physical endowment. But it is highly probably that, psychologically, the first-born may also benefit, if we may so presume, from the early harmonious stages of marriages.

### *Culture: Sparks in the Brain*

Based on such evidence, one could say that nature, through genetic inheritance proposes many potentialities but it is the social and cultural

environment which determines the degree to which such potentialities are realized. Clearly, the vibrancy and vitality of people's lives, barring disasters in the natural environment, will depend on how they interact with other people. This still holds even if the meta-physical is brought into the discussion. It would still mean that social relationships are decisive in allowing or not allowing people to achieve the development held as a promise in their genes or the spiritual fulfillment announced in belief systems. In other words, to paraphrase T.S. Eliot, between the physical and the metaphysical falls the social. Not, as the poet deemed it, as a shadow but as the 'lightness of being' that fulfills the promise of sustainability for the human world. For, as I have argued elsewhere, it is not the natural world that will ensure the sustainability of our world but rather, the social relationships that will lead people to care for the life-sustaining ecosystems of the planet.

It is fascinating to find how well this perspective fits in with the latest discoveries in neurology. As Professor Wolf Singer so clearly explained at the plenary session of the Pontifical Academy of Sciences, the more the layers of neurons in the cerebral cortex are able to connect in complex ways, as he expressed it, the greater the possibility humans have of developing higher consciousness. The intensity of connections between neurons is fuelled by the stimuli coming from outside the body. It must be clearly pointed out that, since tiny human beings are so vulnerable all such stimuli during their early years come from their immediate familial and social relationships. That is, the child, left on his/her own, or, to belabour the point, left in the wild, could produce very few stimuli for itself. On the contrary, a child surrounded by a great number of adults or children will receive countless opportunities of receiving and processing such stimuli. Granted that it is the quality of such stimuli rather than simply the number of them that makes a difference, any social scientist would affirm that *primary social interactions are responsible for producing the sparks in the brain that lead to full human development*. After that, a 'sparked' individual will be able to interact with the world in its full richness and mystery.

### *Culture as a heuristic tool for science*

A different use of the concept of culture, that of constituting a heuristic tool for research, especially in anthropology and sociology, has placed culture within science. Culture was coined as a heuristic concept at the end of the 19<sup>th</sup> century, by Edward Tylor in the seminal book bearing that title. He proposed a 'holistic' definition of culture as a methodological

instrument to be applied to societies understood as totalities. At that time he was in fact reacting to James Frazer's classic study, *The Golden Bough* in which he carefully selected beliefs, myths and rituals reported from many different societies, to piece together apparent regularities in the way in which human beings thought about the world and about themselves. As opposed to this view, cultures, Tylor insisted, should be analyzed as a coherent set of norms that human groups create to organize their social relationships and institutions.

Since that time, the concept of culture has gone through an evolution as rich as that of human phylogeny but in a speck of time. Already in 1948 Melville Herskovitz published a famous article listing more than 200 different definitions of the term culture. In ensuing years, through the work of Clifford Geertz, Umberto Eco, and the postmodernists, its definition has shifted from defining culture in terms of norms, to that of analyzing it in terms of meanings.

In the 1990s, however, the critiques of the concept of culture in anthropology piled up so high that in 1999 *Current Anthropology* thought it necessary to published an article by Christopher Brumann entitled 'Culture: Why a Successful Concept should not be discarded'.<sup>1</sup> Nonetheless, the term is still much in use in 'cultural studies', critical theory, the study of cultural diversity and pluralism, and, interestingly in the 'culture wars' in some countries, namely, the United States. Culture, then, is very much within science but, lately, brought into play in a very bellicose way.

This reflects what seems to be a paradox in the use of the concept of culture. While it is under interrogation and facing possible effacement in scientific discourse, 'culture' has emerged as the term to address many very different political and social issues in current world development. This is why, in this article, I have chosen to briefly describe the intricate web of meanings and interests behind the use of this concept in current international debates on development.

### *Cultural Challenges in a Globalized World*

The cultural challenges to humanity in a world in transition give the curious impression that they advance through contradiction. The more globalization spreads, the more fragmentation into particular cultures is on

<sup>1</sup> Brumann, Christopher. 1999. 'Culture: Why a Successful Concept should not be discarded' in *Current Anthropology*, Supplement, February 1999.

the rise. The more communications expand, the more individuals seem to live isolated lives. The more consumption for pleasure increases, the more people lose the meaning in their lives and turn towards drugs, alcohol, obesity, crime or Prozac. The more poverty increases, the more people dream of becoming media celebrities. The more democracy takes root, the less people seem to make sense of their political world and out of fear retrench into intolerant attitudes.

Are these temporary phenomena, a passing phase of maladjustments on the way to improved standards of living for all? Or will unprecedented levels of inequality portend a future of perennial conflicts? In any case, the deepening of several different kinds of impoverishment, other than economic, must also be given urgent attention.

In fighting against poverty international agencies and national governments are only beginning to understand the very grave consequences of social and cultural impoverishment. The monotonic encouragement of competition as the only and most desirable value is leading to the highest levels of economic inequality in the history of capitalism. In a world context of deregulation, it has fostered greater corruption in both the public and the private sectors, political clientelism and favoritism, discrimination against women and minorities and, most importantly, the destruction of the capacity to cooperate among all. This social impoverishment is very difficult to stem once distrust and violent competition are put into play. Police and military actions may stop the worst delinquent behavior but it will not root out the source of the frustration and hatred. They may, in fact, push violent behavior further towards terrorism.

Cultural impoverishment, however, is undeniably the loss that is most irreversible of all. Knowledge that has been accumulated for millennia by many, many peoples around the world, is being wiped out in a few years. Why is this diversity of cultural knowledge necessary in today's world? There is no doubt in my mind, as an anthropologist, that we need this vast reservoir of alternative knowledge to continue to find the best options for the future by exploring a diversity of solutions in every sphere.

Culture, science and society have always advanced by contrasting alternative ways of thinking and doing. Every aboriginal group survived in difficult ecosystems by evolving tools and ideas through trial and error. Every historical epoch presents humanity with unprecedented challenges it must overcome by trying out different strategies. In fact, the genius of the West has been its ability to systematize and to apply knowledge precisely through the experimental method, including other peoples' knowledge.

The term cultures, in the plural, in this restricted sense to refer to contemporary groups of bearers of given cultural traditions, acquires in my view a particular meaning. *My definition, in this sense, is that cultures are, simply, philosophies of life.*

As more and more of these millennia-old cultures become diluted, splintered through diverse forces of current globalization, since the eighties, the United Nations, UNESCO and many international organizations have taken up the challenge to mobilize world opinion towards a new vision of culture for international development.

### *Culture as the Soul of Development*

As I explained in a recent paper for the World Bank on the 'Intellectual History of Culture and Development Institutions', based on the successful experience of the Marshall Plan in Europe, economists used the same economic development model in underdeveloped and decolonizing regions. This model has the implicit assumption that ethical, cultural, religious and social variables were unimportant. Since the sixties, however, studies have constantly shown a discrepancy between the expected results of economic policies and the actual results in their implementation, in the view of social scientists, precisely because such factors have been left out of the debate on development.

By the eighties, it was clear that the notion of development itself had to be broadened, as people realized that economic criteria alone could not provide a successful programme of governance, solidarity and well-being. The search for other criteria led the United Nations Development Program to elaborate a notion of *human development* as 'a process of enlarging people's choices'. It measures development in a broad array of capabilities, ranging from political, economic and social freedom to individual opportunities for being healthy, educated, productive, creative and enjoying self-respect and human rights. Culture is implied in this notion but it was not explicitly introduced. It was, however, increasingly evoked by several other distinguished groups, such as the Brandt Commission, the South Commission, the World Commission on Environment and Development and the Commission on Global Governance. Building culture into the broader development strategies, as well as a more effective practical agenda, had to be the next step in rethinking development. In this context, the United Nations General Assembly passed a resolution to create the World Commission on Culture and Development.

This independent Commission was established jointly by UNESCO and the United Nations in December 1992. Chaired by Javier Pérez de Cuéllar, former Secretary-General of the United Nations, the Commission was composed of distinguished specialists from all parts of the world. Among its Honorary Members, were four Nobel Laureates. Between March 1993 and September 1995, the Commission held nine meetings in different regions. On each occasion, scholars, policy-makers, artists and NGO activists presented specific regional perspectives and concerns. These exchanges allowed the Commission to test its own questions and working hypotheses. It explored different lines of inquiry, consolidating some, abandoning others, and opening up paths not originally envisaged.

The first key message by the Commission is that development embraces not only access to goods and services, but also the opportunity to choose a full, satisfying, valuable and valued way of living together in society. Culture for its part, cannot be reduced – as is generally the case – to a subsidiary position as a mere promoter of economic growth. Its role is not to be the servant of material ends but the social basis of the ends themselves. In other words, culture is both a means to material progress, the end of development seen as the flourishing of human existence in all its forms and as a whole.

This is why the Commission was also convinced, and this is a second key idea, that issues of development cannot be divorced from questions of ethics. Views about employment, social policy, the distribution of income and wealth, people's participation, gender inequalities, the environment and much else inevitably are influenced by ethical values. What is true of development is true with greater force of cultural issues. None of the important questions concerning culture and development could be addressed in an ethical vacuum. Values are always present, either implicitly or explicitly.

In its report, entitled *Our Creative Diversity*, the Commission placed at the head of its concerns the notion of a *global ethics* that needs to emerge from a worldwide quest for shared cultural values that can bring people together rather than drive them apart. It then explored the challenges of *cultural pluralism*, reaffirming a commitment to respect all cultures that have values of respect for human rights and for other cultures. It took up the challenge of stimulating human *creativity*, in order to inspire as well as empower people, in the arts, in the field of science and technology and in the practice of governance. It explored the cultural implications of the world *media* scene, focusing on whether the principles of diversity, competition, standards of decency and the balance between equity and efficiency, often applied *nationally*, can be applied *internationally*. The commission

also addressed the cultural paradoxes of *gender*, as development transforms the relationships between men and women and globalization impacts both positively and negatively on women's rights. It was deeply concerned by the potential needs of *children and young people* and sought ways to bolster their aspiration to a world more attuned to multicultural values and to inter-cultural communication. It cast a fresh eye on the growing importance of *cultural heritage* as a social and economic resource and also built on the groundwork laid by the Brundtland Commission to explore the complex relationship between cultural diversity and bio-diversity, between cultural values and environmental sustainability. Finally, it set out a research agenda for interdisciplinary analysis of the key intersections between various aspects of culture and development issues.

### *Towards a new global ethics*

The Commission described the profound need for new global cultural values. Our futures will be increasingly shaped by the awareness of interdependence among cultures and societies, thus making it essential to build bridges between them and to promote cultural conviviality which I termed *convivencia*<sup>2</sup> through new socio-political agreements, negotiated in the innovative framework of a global ethics.

The role cultures may play in the search for a global ethics is complex and often widely misunderstood. Cultures are often regarded as unified systems of ideas and beliefs with sharply delineated boundaries, yet cultures have always overlapped. Basic ideas may, and do, recur in several cultures which have partly common roots, build on similar human experiences and have, in the course of history, often learned from each other. Cultures usually do not speak with one voice on religious, ethical, social or political matters and other aspects of people's lives. What the meaning of a particular idea or tradition may be and what conduct it may enjoin is always subject to interpretation. This applies with particular force to a world in rapid transformation. What a culture actually 'says' in a new context will be open to discussion and occasionally to profound disagreement even among its members.

Finally, cultures do not commonly form homogeneous units. Within what is conventionally considered a culture, numerous differences may exist along gender, class, religion, language, or other lines. At the same

<sup>2</sup> Arizpe Lourdes. 1998. 'Convivencia: the goal of convivability' in *Unesco World Culture Report*, vol. 1:71.



time, ideas and clusters of beliefs may be shared by people of the same gender and of similar ethnic origin or class *across* cultural boundaries, serving as bases for solidarity and alliances between them.

What about recurrent themes that appear in nearly all cultural traditions? Could they serve as building blocks for a global ethics? The first such source, in the opinion of the Commission, is the idea of human vulnerability and the impulse to alleviate suffering wherever possible. This idea is found in the moral views of all cultures. Similarly, it is part of the fundamental moral teachings of each of the great traditions that one should treat others as one would want to be treated oneself. Some version of Kant's 'Golden Rule' is expressed in practically all cultures and faiths.

Many different sets of values would have to be brought to a common ground. It is not necessary to agree with all or give them equal weights but a minimum set of core beliefs would appear to be essential. This minimum set constitutes a point of departure, not a final destination, and the Commission believes that it is possible and greatly to be hoped, that this common ground will increase.

The Commission identified five ethical pillars: 1) Human rights and responsibilities, as the set of universal rights which establishes a standard against which international conduct can be judged, 2) Protection of minorities and vulnerable groups such as women and children, 3) Democracy and the elements of civil society whereby in the political arena, democratic processes should prevail so that people's needs and wishes are taken into account in determining how collective life is organized, 4) Equity within generations and between generations to ensure that all those living today are entitled to the basic necessities for a decent life and those who will come after us will inherit a world of equal or greater choices and opportunities, and finally, 5) Commitment to peaceful conflict resolution and fair negotiation.

#### *Diverse culture, equal vulnerability*

The search for a global ethic must come hand in hand, as the Commission on Culture and Development put forth, with respect for diversity. As stated in the Declaration on Cultural Diversity adopted in the 2001 UNESCO General Conference, diversity is '... the source of human capability of developing: we think by associating different images; we identify by contrasting ways of living; we elect by choosing from an array of options; we grow by rebuilding our confidence again and again through dialogue'.

In this new beginning, to cope with the momentous challenges of sustainability, governance and *convivencia* in a global era, we need cooperation on a world scale putting into play the creativity that can be summoned from all cultures and religions.

As explained in the Second World Culture Report 'it is no longer a matter of globalization allowing cultural diversity to continue to develop, it is cultural diversity as a condition without which globalization cannot continue...':

Diversity must also include all the diverse sectors of societies, among them, women. Civilizations have been built by men and women, each with their respective and complementary contributions.

Scientists meeting at the World Science Organization Open Conference on the Challenges of a Changing Earth, in July 2001 in Amsterdam confirmed that global warming will have decisive impacts on the life of every inhabitant of the planet. Environmental global change thus creates an *equality in vulnerability* also deepened by increased interdependence in one single world economic system.

In *Crossing the Divide* it is pointed out that equality in vulnerability heightens the need for a broader, more political dialogue among cultures and civilizations. Thus, it stimulates dialogue. Because the real answer to equality in vulnerability, leading to equality of opportunity, is the adherence to accepted forms of common behaviour by more and more actors on the international scene. This requires, as stated in this report, '... an act of decision by each individual member of the international community, no matter how small... Perhaps what we are really talking about is no longer individual enemies for individual countries but a multifaceted enemy for all. The spreading of contagious disease, weapons of mass destruction, unrestricted dissemination of small weapons, poverty, all represent different faces of an "enemy" for the entire human race... If the enemy is common, it follows that fighting against it requires unanimity'.

#### *Cultural Values in a Global Era: the Rainbow River*

At present, globalization, telecommunications and telematics are changing the way in which people identify and perceive cultural values. People still have the tendency to think of the world as a 'mosaic of cultures' but this metaphor is no longer adapted to today's world. As mentioned above, cultures are no longer fixed, crystalized containers but have diasporic, planetary representations exchanged instantly around the world through the mass media and the Internet. As we stated in the sec-

ond Unesco World Culture Report, the metaphor that best describes current cultural processes is that of a 'Rainbow River'.<sup>3</sup> We took Nelson Mandela's image when he referred to South Africa as a Rainbow Nation, and applied it to cultural diversity around the world. Cultural currents may mix or may be distinct for a while but they are all following, all changing, all exchanging, all the time.

To go back to the opening paragraph of this paper, as briefly outlined in this paper, the complex history of the relationship of science and culture – in the singular – and cultures – in the plural – explains the different ways in which they are being debated in our contemporary world. The ambiguities in the definition of culture and the implicit assumptions about culture in economic development models led to culturally blind rather than culturally sensitive development policies and programs and to generally well intentioned, yet frequently unsubstantial, institutional responses, both nationally and internationally. Given the problems of globalization, the main challenge for this new century, as stated in the first section of the 2001 World Culture Report, is to find strategies so that '...nations and the global community (may) prevent and remedy the deepening of inequality, especially along fault lines, new and old, that coincide with cultural diversity'.<sup>4</sup> Such a future will only be possible if science and culture work together to understand and to move the world.

<sup>3</sup> Unesco. 2001. *World Culture Report*. Paris: Unesco.

<sup>4</sup> Arizpe, Lourdes, Elizabeth Jelin, Mohan Rao and Paul Streeten. 2001. 'Cultural Diversity, Conflict and Pluralism' in *World Culture Report*, vol. 2. Paris: Unesco: 23.

## DISCUSSION ON THE PAPER BY ARIZPE

RAO: As a sociologist, I thought you could help us clarify a thing that bothers me. I am going to refer to it tomorrow in my presentation. While the diversity of cultures and so on and related aspects are very, very important for this world according to me, science is doing exactly the opposite of that. The effect of science, including IT, globalisation, is to bring uniformity to everything. If anything, it destroys cultures, and has destroyed many language dialects in my own neighbourhood. I will refer to that tomorrow. They say science has nothing to do with this, that science is just discovery, innovation, and so on, but it is not so. Indirectly, science has a responsibility for all this. I do not know if you can say something about that.

ARIZPE: Yes, I would be glad to, because we have been going over the same question many times, especially in the commission. I would ask you: do Japan, the United States and France have the same culture? They don't. They even have different ways of living, different philosophies, different *savoir-faire*, and yet they all live within a capitalist world and within an international market. So, the question is not whether cultures and development are compatible, but how they can be made compatible, and there are ways. We do realise that there are some cultures that are extremely vulnerable, and these are the nomadic peoples, horticulturalists, and the hunters and gatherers, because their ecosystems are being destroyed by development or by the market or other forces, and there seems no way of stemming this destruction.

SINGER: I have two questions. The first relates to wolf children. I just wanted to know how good those studies are, and what the examples are. The second question refers to the dichotomy between science as one source of knowledge and culture or inborn knowledge or tradition as the other. Everybody would agree that one should not destroy the knowledge base that a population of farmers has on how to grow crops and things like that. Also,

nobody would dispute that there is some intuitive knowledge that takes into account variables that cannot be consciously grasped and put together into a scientific theory because there are just too many of them or they are only known intuitively or through tradition, but don't you think we have an obligation to destroy false belief systems? In medicine, for example, there are the practices made through so-called 'overcome knowledge' which are extremely deleterious to the subjects, and I think there is an obligation for Western scientific medicine to go there and say, 'Look, this is not good for your patients because there is no ghost besieging them, they have a serious infection'. How about this distinction between the good and bad impact of science?

ARIZPE: As regards the studies of wolf children, there have been a number of them, except that the circumstances have always been rather difficult. Several of these cases occurred in the nineteenth century and there has never been a really rigorous scientific study of them because it is so rare for such children to survive. But the conclusion is clear from even these studies: there is a potentiality there that these children never developed. On the dichotomy between science and culture, this is an interesting question because many peasant societies, for example, have an extremely advanced and refined knowledge of plants and animals: ethno-botany, ethno-zoology. Now, are they false? Well, they are not false, you see, because they are based on certain principles that their cultures proclaimed as the most important. In anthropology, ethno-methodology has studied this: the principle of classification of some plants may be whether they are edible or not, and in that sense they open up other options for classification that the Linnean system does not possess. So, there is, I think, a valid ethno-science, but there may also be totally false beliefs linked to forms of social or religious or political control of societies, and that's an entirely more complex question.

ZICHICHI: I was very interested in your stimulating report. Your title was 'The Cultural Values of Science', and therefore I am forced to make this remark, because you said that scientific observations and discoveries depend on culture. If this were true, there would be many sciences, but if everything is science, nothing is science. There are many cultures, but only one science, because science is the logic of nature, and there are not two logics of nature, but only one. Since your lecture refers to a very important part of our conference, the cultural values of science, I am sorry to insist in making this remark: there is only one science and many cultures.

ARIZPE: I never said that scientific observations depend on culture. I just said that there was this very broad anthropological definition. I would not say that science depends on culture.

VICUÑA: A brief comment on this last remark – perhaps we can say that there are several ways to acquire knowledge: one of them is science.

ARIZPE: Yes, I think that would be a good way of putting it. However, I would also add that there may be different logical ways of understanding nature. Is that too heretical?

RAO: I would like to make one comment: while there are many cultures and one science, the approach to learning science has a tremendous cultural effect. A young child in a village in India or Bangladesh cannot learn science the same way as a city boy in Rome learns science. I think you should not just say there's one science and many cultures, It is not that simple, because culture has a tremendous effect on the way we appreciate nature. We wonder whether there is one nature. The way we understand it, the way we approach it, these are entirely different questions. I think that we should not oversimplify this matter.

ARIZPE: I would agree on that.

ŁOJASIEWICZ: You see, I would like to say, after the observation made by Professor Zichichi that there is only one logic of science, that we observe the world. I am somewhat close to the point of view of René Thom. There are many observations by which we try to describe some phenomena. There are many ways of describing them, many ways of doing this, and I don't know if we can speak in a very precise and clear way about what logic of science means. It may be very useful to explain what we mean by logic of science. It does not necessarily depend on culture; it may depend on culture, but we have many ways of seeing a phenomenon and describing it, even in a mathematical way, there are many different forms of mathematics, different forms of mathematics applied to describe a phenomenon. I am sorry, I am only a mathematician, I am not a physicist, but it seems to me that, as far as I have heard, and for example I connect here with the ideas of Thom, I do not understand what is meant by the view that there is only one logic of science.

ARIZPE: Could I just add that there might be one logic of science, but there might be other cultures that have observed things that are scientific in a different way because their needs push them to observe things that a city boy would not need to observe. So, what I mean is that the knowledge accumulated by other peoples can be added to science. Science could go into the molecular or chemical structure of something, but it has already been observed by an indigenous culture.

ZICHICHI: The chairman does not allow me to answer, but I can answer you in private. I totally disagree with you.

MENON: Mr. Chairman, I did not want to make any major comments here, but I thought that I would just tell you a little story about a question that one of the former members of this Academy, Abdus Salam, used to ask me. He said that when he looked at all the discoveries in mathematics and modern physics of recent times, he always found that, when the group theoretic approach was taken, the people who did it were Jewish in origin, and when he looked at approaches that were not group theoretic but analytical, they were non-Jewish. One doesn't know whether there is something in the tradition, in the way that children are brought up, which looks at groups and sets as being fundamental to thinking, which enable them therefore to make those discoveries later in life. We do not know about many such aspects; but I think much more study needs to be done on how your cultural setting enables you to look at things. That relates to the approach you take, not getting to a different science. Science, as we all agree, is an attempt at a description and understanding of nature. That cannot be different anywhere. There cannot be a science which is Indian science, or Chinese science, or Western science. But how does one arrive at that description and that understanding?

LÉNA: Thank you, Mr. Chairman. I just wanted to make two very quick points. One is that there is a relationship bridging science and culture, which is language, which of course is absolutely essential in education, and the fact that science, before being expressed in mathematical language, has to be expressed, especially in education, through layman language is a point where the relationship between culture and science occurs, and this should not be forgotten. My second point is quick, it has to do with your remark, Madam, about the ways of looking at things. Sun spots were observed in China with the naked eye almost two thousand years before

they were observed by Galileo with a telescope: hence they could have been seen before in the West and were not! This has a direct consequence: had they been observed, then it would have been immediately discovered that the sun was rotating on itself.

ODHIAMBO: I just wanted to add a footnote to the question of the approach to scientific knowledge, and I want to give the example of disease. In African indigenous societies, and I am sure this applies to many other indigenous societies, disease is not simply parasitic, it is also the question of connectedness, family connectedness, society connectedness, community connectedness, and when you disrupt that connectedness you become sick, and therefore when you look at disease it is more complex than simply looking at the microbiology. That can be seen and it was very well illustrated by the work of Tom Lambo in Nigeria, who was able to solve psychiatric illnesses much more than anybody else. His first contact was to look at the community connectedness of the person who was sick and he did not try to bring in drugs until much later, and in most of the cases he solved matters without the use of any drugs at all through simply talking to the patient and resuscitating the broken community connectedness.

ARIZPE: I agree very much. The point is that if a person feels that a spell has been sent against him, he will die. But this not only happens in Africa. In the whole world why do people die of unrequited love?