

The Limitations of Cross-cultural Transfer of Science and the Responsibility of the Scientist*

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Science changes man and his environment for better and for worse. The question of the responsibility of scientists becomes increasingly pertinent, even more so in the context of cross-cultural transfer of science. There is no such thing as pure science, each and every science is based on certain underlying values and non-scientific assumptions. Claiming to refrain from such a bias is itself already a non-scientific assumption. So I think it is legitimate at the beginning of this conference to inquire into the inherent implications.

By observing things man projects his ideas into them, thus initiating change. So do scholars and scientists, even when aiming at the greatest possible objectivity. Even the physicist, by the very application of his instruments, may change the outcome or even the object itself.

Western science certainly has its roots in the classical Mediterranean world. The Christian interpretation of the Book of Genesis, 1, 28: "... be fruitful and multiply and fill the earth and subdue it..." together with Cartesian dualism and the consequent methodological approach of objective observation of the subject, produced man the observer and user, standing outside "Creation" and using it at his whim and will. The consequence of this has been centuries of systematic exploitation of the earth, with ever more powerful and dangerous technology. Greed and the phenomenal rate of procreation makes man even more dangerous to the environment on which his life depends. The question arises whether or not science and technology were only able to develop because of the specific Western divorce of subject and object, which by its nature carries the danger of destruction as well as manifold constructive achievements to ease life. At last we seem to have reached a time of reconsideration. A certain critical review started in the mid-seventies. The recent victims of Bhopal and Chernobyl, or the countless victims of desertification and land-exploitation, may, one hopes, prove to be martyrs in a new chapter of the history of mankind, at the very dawn of a new millenium.

At this particular moment we may ask ourselves what position we as scientists should adopt in the field of cross-cultural research.

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We were each brought up in our respective cultural environment as well as in a culture-specific academic setting. We are asked to exercise scholarly discrimination and to be aware of the fact that science carries values which may seriously interfere with traditional values. Scholars, scientists and technicians, like conquerors or missionaries, bring change in one direction or another: for example, the physicist who discovers the dangerous game of nuclear fission, as well as the anthropologist who pokes his nose into a foreign culture. There are also other aspects: the linguist or historian who, involuntarily or intentionally, helps a whole sub-continent to rediscover its own cultural identity during a period of foreign political and cultural dominance.

Today scientists are asked to identify problems of cross-cultural interaction which may be more destructive than helpful. Scholars may serve as a kind of catalyst in this dangerous geo-political and geo-economical power game with high technology as its tool. They are also asked to help to control the various systems of potential self-destruction which scientists and technologists have invented.

Mankind is trying to find "truth" and we are as far away from it as ever. Science is only one way to come closer to the truth. Throughout the ages there has been a fruitful exchange of human thinking. Thoughts have continuously crossed the continents, conquering, extinguishing populations, imposing power. With power religion, philosophy, science and technology were transferred in all directions, implanted, absorbed, discarded. To understand modern problems we have to look into the history of mankind rather than of nations. We need historians to show us the relationship between what we do and what was done in time past. On the other hand, it seems to be the experience everywhere that people do not learn from history, maybe because historians or philosophers rarely become politicians or generals; or because historians were in the past paid to glorify their employers.

In my own area of research I feel uneasy in, for example, the endeavour of dealing scientifically with cultural areas about which I understand less the more I get involved. The European scholar is in danger of losing his objectivity as an outsider the more he gets involved in the non-European cultural context. The non-European scholar tries to measure his own cultural heritage with a European gauge, which may not be appropriate either.

We cannot have access to Ayurveda via science, should we feel impelled to understand the Indian approach to health. Some Indian scholars apologetically try to justify Ayurveda or Yoga rules and remedies in scientific terms, which is totally inappropriate. Both approaches are liable to fail.

I would like to share some of the problems we have with medical or health sciences in the context of cross-cultural scientific dialogue. I do not specify at this moment dialogue between whom; I will come to that later. I would like to

take medicine as a generally understood parameter of development, an example of this scientific dialogue. Medicine has to do with healing in countless individual cases of ill-health and disease, in contrast to healing, in the religious sense. Medicine, and, for that matter, medical care, must be readily available, acceptable and applicable, it must thus be communicative.

In reality even specialists have communication problems among themselves, not to mention communication barriers between specialist and doctor, between doctor and patient within one culture and language or between cultures and languages. Medicine and the medical sciences should furthermore be an integral part of the health sciences, which include aspects of health promotion, health care, disease prevention, and the wide field of ecology and environmental sciences.

So-called modern 'western' scientific medicine, to use these value-laden labels, is so powerful that almost no dialogue is possible without a set of intermediaries and interpreters. By contrast so-called traditional medicine in its own setting is by definition communicative. The traditional healer interprets the ill-health of an individual in his physical and metaphysical context. The outcome in terms of healing is open more often than not, in both modern and traditional medical systems.

Modern medicine – a label for science, as opposed to humanities – is based on the laws of nature, or what we know of them, and has to follow certain rules of significance, reproducibility and predictability. With its bioscientific and biotechnological achievements modern medicine has become of global relevance. For this there is abundant evidence; there are numerous scientific success stories. We use the term "the natural science paradigm of medicine". These laws of nature and therefore the application of the bioscientific and biotechnological achievements are universal. The biochemical processes in the body cell, the physico-chemical process of exchange of ions through cell membranes, the pathological mechanism of a bone fracture or a disease: all obey the same laws of nature, whether in Heidelberg or in Hyderabad, in an urban or rural setting, in an industrialized or non-industrialized country. There is no difference in that; but scientific medicine as applied to man, concepts and means of medical care derived from these universal laws of nature, do vary greatly within our one world. This is the big and tragic difference between modern medicine and non-modern medicine. Science is universal; although scientific medicine claims to be the universally valid medicine, it is not.

It is not only that medical care is unequally available – this is said to be primarily a matter of resources and economics – but that the whole socio-cultural background from which modern medicine is derived and within which it is able to function is different. Concepts of health and the causes of disease, patient behaviour or therapeutic concepts are primarily defined in our culture today by science,

whereas in other cultures different concepts are in operation.

Though we should not forget: differences in cultural background exist within Europe too and are strongly reflected in patient behaviour or in medical practice and treatment schedules. These differences become even more glaring when one compares western medical practices and rituals in developing countries under different historical and cultural influence. Comparing French- with English-speaking African countries where relics of Western medical traditions can be easily traced, one finds oneself faced at times with a caricature of medical practice.

In order to explain what I mean, let me deviate into the history of medicine for a moment. Since the dawn of mankind, each and every society has had, and still has, its own medical systems. Medicine, like language, religion, philosophy or art, is a characteristic part of a culture during a particular period of its history, including the present. Like those other cultural assets, medicine has never been static; it has changed throughout time and space. Medicine has always been a commodity, exported, imported, transferred peacefully or forcefully, by learned scholars or conquerors, missionaries or traders, even tourists. All great physical and intellectual streams and currents carried medicine into other areas: the medical system of Hippocrates, with Greek, Roman, Hellenistic and later Arab cultural and political influences, was carried all over Europe, Arabia, into Asia; Ayurveda into Indonesia with Hindu expansion; Chinese medicine to Europe with Marco Polo; Spanish folk medicine, derived from the Arabic medical school in Spain, to Latin America with the conquistadores, and quinine from there via Spain to Europe and, during the colonial period, all over the world. Shamanistic medicine spread with migration from Central Asia to the Americas and into East Asia, and so on. Medical systems from literate cultures which were by nature more expansive and lasting than non-literate cultures had a much greater chance of spreading than local folk medicine.

Yet certain archaic concepts of health, explanatory models of disease causation and methods of physical and metaphysical healing can be traced in all cultures, including our own. This mixture is so confusing that it is impossible to distinguish between autochthonic and imported concepts.

What was true in the past is true in modern times. Modern scientific medicine has been carried by the same vehicles: formerly by explorers, Christian missionaries, colonial powers; now by peaceful scientific collaboration, technical assistance, academic exchange, and forceful exportation. Salvarsan spread from Europe after World War I, penicillin with the allied troops at the end of World War II, today cardiac surgery and renal transplantation through adopted scientific ambitions, nourished in American or European medical schools.

A particularly sensitive area is the international pharmaceutical business and the inadequacy of governments in passing and implementing laws and drug regula-

tions relevant to the needs of their country, as we have seen for instance, in Bangla Desh.

We have to realize that outside its own cradle, modern medicine has not really got its own scientific or innovative dynamics. It always was and still is the over-spill from Europe and America, of which these outside areas take advantage, or from which, as often happens, they learn bad habits.

It was the need to combat so-called tropical diseases in order to protect colonial invaders and military or indigenous labour that brought medicine into tropical countries, like quinine in the early days, or chloroquin in the '40s, to treat malaria. Mefloquin, the most recent antimalarial drug, was first synthesised by US Army research laboratories. Diethylcarbamazine was developed to protect American troops in the Pacific from filariasis.

The wide range of vaccines indispensable today in the protection of populations from infectious diseases was originally developed in the West for the Western population. Even today, it is extremely difficult to persuade the pharmaceutical industry to go in for the development of new drugs or vaccines against the still unsolved medical problems in the Third World. The great achievements of modern pharmaceutical industries, particularly in the field of parasitology, are either haphazard discoveries, like Praziquantil against schistosomiasis, or developed as veterinary products against animal parasites, like Mebendazol or Ivermectine. It involves the World Health Organisation in a high financial investment to get these drugs developed for human application in developing countries, where they are badly needed.

There are many more examples which show that medicine closely follows the overall process of change. There is no doubt that Western medicine has enormously helped in the prevention or cure of diseases in areas where the traditional medicine systems were at a loss; the more so as more diseases associated with the modern Western lifestyle are spreading outside the West. All the same, it is clear that the non-Western societies must find or regain their own identity in the field of defining health needs and concepts of health care, just as in other fields. In the search for this identity, we find that in many areas a strong iconoclastic fundamentalism has arisen. I do not believe that this will help anyone out of the dilemma. But as far as medicine and medical and health care is concerned, developing countries have to define their own way and learn to adapt the achievements of modern medicine to their real and perceived needs in their own cultural context. This is a highly political issue, and as most politicians need modern technology to remain in power, they may thus feel the need for cardiac surgery.

A scientific dialogue is needed, not only cross-culturally, whether North-South or West-East. Dialogue is also needed within medicine itself, and across disciplines. By dialogue I mean explicitly a two-way exchange, not the old

beaten track of monologue. The Central Drug Research Institute in Lucknow, founded by Mahatma Gandhi himself as an instrument of scientific emancipation, is one of a few promising examples.

As a disciple of modern medicine, dealing with health and health care problems in so-called developing countries, exposed to interdisciplinary and cross-cultural dialogues for more than 20 years, I am sensitive to the problems of transfer of medical science and technology and its very complex implications. I repeat: there is no question but that scientific medicine, as opposed to all non-scientific medical systems, will increasingly take over medical and health care worldwide. There is on the other hand ample evidence that this bypasses the majority of mankind. What is left of modern medicine in the periphery, in the rural areas and in periurban slums where four-fifths of mankind live, is an impoverished surrogate of modern medicine, while in the centres of excellence the attempt is made to implement modern scientific medicine at all costs, using 80% of funds for less than 20% of the people. Next to modern palaces of medical research, children are dying of malnutrition and malaria.

I would like to comment only on one item, traditional medicine: when the World Health Organisation advocates the mobilization of traditional medicine to achieve health for all by the year 2000, is this an awakening from an unrealistic dream; is it the declaration of bankruptcy of Western medicine; or is it the breakdown of a paradigm?

I would say all three, but the first is the most relevant. Without mobilizing, or rather recognizing, traditional medicine in most developing countries, the goal will never be achieved by the year 2000.

If we as scientifically trained Western doctors look realistically at the problem of health care in the Western world, and, even more so, in non-Western societies, we have to admit that we are by no means the only source of health care, whether we like it, see it, admit it, or not. In all societies, a vast number of non-scientific concepts of health, disease- and medical care exist, co-exist, compete with scientific medicine. From the professional point of view this is quite irritating. It is also irritating for the patient, particularly when each medical system claims, to have the answer. The patient must resort to a kind of healer shopping through the various systems, if he is forced to do so by his suffering and if he has the choice.

To come back to the acceptance of traditional medicine by the World Health Organization in order to reach the goal "Health for all by the year 2000", I would rather say the proposal is irrelevant, because traditional medicine is accessible to all and accepted by all, and has been since the dawn of mankind.

The only thing I am afraid of is that this programme of integrating traditional medicine will ultimately destroy traditional medical systems, pull them out of their cultural context and turn them into quackery. The result will be an un-

healthy, dangerous amalgamation of Western and traditional medicine, both of them seriously impaired, to the disadvantage of the sick.

Not only is modern medicine in developing countries scarce, but the scanty resources are greatly wasted or even underutilized. The bulk of human suffering from ill-health would respond much better to overall development and social justice than to erratic curative medicine covering up the symptoms rather than addressing the real causes of ill-health. Even in the centres of excellence where a high standard of modern medicine and medical research is available, the necessary infrastructure and the full range of technical, financial and personal support are still lacking.

There is evidence in many countries that modern medicine does more harm than good, for example, all surgical skill is wasted if proper, hygienic, pre- and post-operative care is not maintained, or the necessary monitoring fails. Health care management is a particularly weak point. The most significant failure of management was the sad event of the assassination of Indira Gandhi. Even a head of state could not be saved by immediate transfer to the most excellent medical intensive care unit, but had to be taken by private car through all the traffic jams of New Delhi. This symbolizes what happens when much-desired quality is let down by inadequate infrastructure and nonexistent emergency care. These few examples may suffice to illustrate the problem to an informed audience such as this, with vast and probably very close personal experience in the field of health care. They underline the problems of the transfer of technology without – we are inclined to say – the necessary socio-economic background, but also, I maintain, without the necessary cultural context. These are two areas which we have to look at separately.

Modern medicine is so expensive that it needs an industrialized, affluent society with a dense network of social security to be able to reach at least the majority of the people or else one has to define priorities of a different nature adapted to the capacity of the society.

Modern medicine has also struck the economic ceiling in Western societies, and new ways out of this dilemma have to be found. More than that: modern medicine with its constraints and limitations has reached cultural, or, may I say, ethical, philosophical barriers. Hence the problem is not just a cross-cultural, it is also an intra-cultural dilemma.

Lessons learnt during past experience of the adaptation of Western medicine to developing countries are more and more being retransferred to the Western societies. In Germany, staff returning from voluntary medical service overseas are a refreshing input into the professional scene here.

About 10 years ago the World Health Organization with the backing of the World Health Assembly, stressed this worldwide dilemma of medical care and

issued the programmatic request for "Health for all by the year 2000" through the concept of primary health care. By defining this goal as an overall strategy of development for health grounded on the basic-needs strategy the concept was to be advocated explicitly for all, not only for the developing world. It received the least attention in the West, for obvious reasons.