

Science and Man

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Surely there is no more central theme in a course of the kind represented by Nature, Science and Man than the link between science, the society in which science is found, and the human values, the ethic, by which both science and society are judged. My credentials, the fact that I am no expert on this topic, raise the question of whether any real experts in this area exist at all. This in itself is thought provoking.

The theme of this lecture is abstracted in the following diagram which implies that science is separate from society.

SCIENCE ←————→ HUMAN VALUES ←————→ SOCIETY

This view is adopted by some, but not all of those who have considered the problem. Those of you interested in logos or crossword puzzles can play games with the two words to show their relationship.

S
C
S O C I E T Y
E
N
C
E

Parenthetically, this scheme represents the view of some, that science and society are at cross purposes.

If one were to sample opinions of the population making up society, I think that four general views of science vis-à-vis society (our collective value system) would be found. Science is variously regarded as society's:

1. Mistress
2. Observer
3. Servant
4. Enemy

1. Science as a Mistress

Firstly, science viewed as a mistress is transformed into a taskmaster, and a value unto itself. This is the role of science most often seen by those who actually work in science. Science becomes comparable to a religion. Just as society places demands on people so does science; to require exploration and development for its own sake. Science can be defined from this perspective as: "the exploration, largely by experiment, of the environment around us using the laws of physics, chemistry and mathematics." This is 'hard science', further defineable as "knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws" and "a systematic knowledge of the physical or material world.

This is the most narrow definition, as well as, the most common view which has been built up and fostered by the scientific 'professions' - those which have mastery of the facts and knowledge pertinent to a particular sphere of science. These particular spheres are the 'sciences', as distinct from 'Science'. Science is a general term, quite different from the concept which might arise out of an aggregation of the 'sciences', those fields of specialization such as biology, physics and chemistry ...the list is very long! This underscores the fundamental issue of the increasing multiplicity of science and the importance of a counterbalancing interdisciplinary overview. Buckminster Fuller, technological visionary and Brockington Visitor to Queen's in 1974, comments on this problem in the Operating Manual for Spaceship Earth (Southern Illinois University Press, 1969, p.13):

"of course, our failures are a consequence of many factors, but possibly one of the most important is the fact that society operates on the theory that specialization is the key to success, not realizing that specialization precludes comprehensive thinking."

Consider the aptness of this description of the fragmentation of science. In, for example, our rush to develop the perfect automobile and the super-sonic transport we have achieved a great technological feat of getting somewhere quickly and in comfort; but in doing so we have ignored the impact of our science on energy consumption, social disruption and the environment. Historically, the Industrial Revolution is the classic case of non-comprehensive thinking on a grand scale. By engaging in that Revolution we may, just may, have created an exceedingly high standard of personal living at the cost of creating the seeds (in pollutants, social disorder and so on) of the destruction of the environment and social order which sustains life on this planet.

2. Science as an Observer

In the second common view of science - as an Observer, the position of science is analagous to that of a psychoanalyst of society. This is the view of those who would have science explain the human condition as well as describe and evaluate the environment. It is another 'hard science' view.

This perspective is illustrated by a story currently being told of three academics, a poet, an engineer and an economist, stranded on a desert island with only one can of beans for sustenance and no means of getting at its contents. The poet writes an ode to the content of the can, arguing for the intellectual satisfaction thereby achieved. The engineer, an 'action man', attacks the can with a rock. The economist cries, "Stop! We are all going about this the wrong way, first we must assume we have a can opener." The economist's approach is to use his science as the observer or analyst.

Science in this role explains the human condition but stands aloof from it. It allows us to learn what is wrong with society and our environment and to predict what will get better or worse, but does not extend to putting in place actions to avoid the predictions coming true. It has, however, the added dimension of the social world to add to the physical and material. It deals with how man influences man and includes in its goals the search for general laws of human behaviour and interaction. The major manifestation of this view of science is the development of our system of laws, constitutions, moral codes, political enterprises and economic theories, entailing the increasing codification of what once were individual standards of behaviour into rules. The human spirit is thereby governed by the code of the average expectation of society. The codes unfortunately can only govern actions not motives; it is entirely permissible to hate your brother as long as you obey the law.

3. Science as a Servant

The third major view is 'science as society's servant', in this guise science is one of the tools by which society achieves its goals. This is the classical bureaucrat's view of science epitomized by the shopworn phrases, "R&D", "mission oriented", "applied", and is generally what governments are sure we don't have enough of because we have problems in society. Our hard and social sciences have let us define and analyze the courses of our problems, leaving the applied sciences to tell us how to deal with these problems in some constructive fashion. A case in point is illustrated by the situation at Grassy Narrows near Kenora, where analytical science showed that the Indians were getting sick and dying as a result of mercury poisoning, occasioned by eating fish which came from rivers contaminated by a chemical company, which was in business so the citizens of Kenora could have jobs, buy food and thereby avoid social upheaval and death by starvation.

This was a great analysis but we have no 'action science' to help the situation. Hard science can not get the mercury out of the water, the fish or the Indians and analytical social science can not provide a system, at a price we can afford, for full employment without pollution. Therefore governments, elected by society to run things according to our system of laws, catch a lot of flak which they then in turn lay at the feet of the absent science (represented in particular by the universities), which cannot provide a solution to their problems.

Here science becomes a tool of the system of laws - the output side of analysis; first to understand, then to codify and finally to regulate the human condition.

4. Science as an Enemy

The final view of science differs significantly from the first three by interpreting science as a negative value - the enemy of society. This view holds science to be a mechanical, conscienceless cult - the antichrist - a demon which drives man in ways opposite to his nature and which thus should be suppressed and eliminated. This perspective entails the assumption that society must govern science, not only in its action but also in its analysis, creating an atmosphere of 'controlled curiosity'.

This misanthropic view of science as anti-man is epitomized by Loren Eiseley's reflection on the consequences of the advent of man in the evolution of life (The Firmament of Time, New York: Atheneum, 1966, pp.123-4):

"It is with the coming of man (for man read 'science') that a vast hole seems to open in nature, a vast black whirlpool spinning faster and faster, consuming flesh, stones, soil, minerals, sucking down the lightning, wrenching power from the atom, until the ancient sands of nature are drowned in the cacaphony of something which is no longer nature, something instead which is loose and knocking at the world's heart, something demonic and no longer planned - escaped it may be - spewed out of nature, contending in a final giant's game against its master."

Now here is a view of man's science which puts both science and man in the role of demon. This is the total ecologist's view that only nature is good and free from sin whereas man and science are neither good nor sinless; truly Adam and Eve cast out of the garden.

Examined critically, this is a curious view in many ways, not the least of which is that it holds nature to be ideal and independent of man. Man is held to be a creature foreign to nature, an alien on spaceship Earth. This is a very Romantic view of nature. In reality ecology relates to predatory relationships, where plants rot and decay, little things suffer and die to feed bigger ones and so on. As Tom Derr relates, the ecology of a summer pond is nothing more than systematic murder. It is hard to romanticize a food chain.

All these views of science have some validity of course, but none is capable of putting science in the context of society as we know it. The question remains: Can science exist independently of human values? If science is either a mistress or a demon it can. Those who experimented on the Jews in extermination camps in World War II can be said to be practitioners of a science without human values. The sciences which allowed for the development of sovereign countries to inhibit the distribution of food from areas of plenty or even excess to areas where people starve can be said to be malevolent, evil, devoid of human values.

But is this so? It is said that science itself does not have a conscience. To quote Tom Derr: (Ecology and Human Liberation, 1973, World Student Christian Fellowship, Geneva)

"Science does not dictate an ethic, and strictly speaking, nature is not 'wise'. A scientist certainly has an ethic but it is one brought from home to his work. Scientific work itself is morally neutral. It acquires more meaning only in terms of the uses to which man may put it, the place to which he assigns it in his scheme of purposes."

Science itself may have no conscience but science does not exist without human understanding - science is not value free. We are compelled to conclude that there must be some way to judge the value decisions which appear inevitably as determinants of the work of scientists themselves. So society punished those who misapplied science in the extermination camps and praised the courage of those who bombed Hiroshima. Demonstrably, science does have human values in our society.

In spite of this, the value which society may assign to a particular application of science may change - the science does not but the assessment of it does. A mundane example of this is the development of spray deodorant. In order to achieve the dubious good of a neutral body smell we must be willing to accept the expenditure of energy and resources to get it into the can, and the potential long term effects of freon released into the atmosphere on the ozone layer - perhaps condemning our grandchildren to skin cancer or worse.

Ivan Illich speaking of science as a typical human enterprise said:

"When an enterprise grows beyond a certain point (on a natural scale relating men to his tools), it first frustrates the end for which it was originally designed, and then rapidly becomes a threat to society itself." (Tools for Conviviality, New York: Harper and Row, 1973 - part of the series 'World Perspectives', 47 Ruth Nanda Anshen ed.)

Is this where we are today with the direction of our science? As examples of this dilemma, Illich describes in the opening of his book the two watersheds of modern medicine. One occurred in 1913 or thereabouts when for the first time a patient, when consulting a graduate of a medical school, would have more than a 50% chance of some benefit from the encounter.

"Since then medicine has gone on to define what constitutes disease and its treatment... This progress was due to new perspectives of the origins of some of the ancient scourges; water could be purified and infant mortality lowered; rat control could disarm the plagues; treponemas could be made visible under the microscope and Salvarsan could eliminate them with statistically defined risks of poisoning the patient; syphilis could be avoided, or recognized and cured by rather simple procedures; diabetes could be diagnosed and self-treated with insulin could prolong the life of the patient. Paradoxically, the simpler the tools became, the more the medical profession insisted on a monopoly of their application, the longer became the training demanded before a medicine man was initiated into the legitimate use of the simplest tool, and the more the entire population felt dependent on the doctor. Hygiene turned from being a virtue into a professionally organized ritual at the altar of a science."

"Only in the mid-fifties did it become evident that medicine had passed a second watershed and had itself created new kinds of disease."

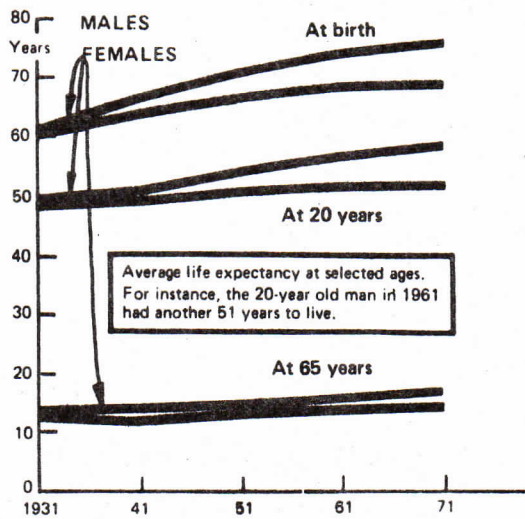
"Foremost among introgenic (doctor-induced) diseases was the pretense of doctors that they provided their clients with superior health...during the past fifteen years professional medicine became a major threat to health. Huge amounts of money were spent to stem immeasurable damage caused by medical treatments. The cost of healing was dwarfed by the cost of extending sick life; more people survived longer months with their lives hanging on a plastic tube, imprisoned in iron lungs, or hooked onto kidney machines. New sickness was defined and institutionalized; the cost of enabling people to survive in unhealthy cities and in sickening jobs skyrocketed."

"The exclusion of mothers, aunts, and other nonprofessionals from the care of their pregnant, abnormal, hurt, sick, or dying relatives and friends resulted in new demands for medical services at a rate much faster than the medical establishment could deliver."

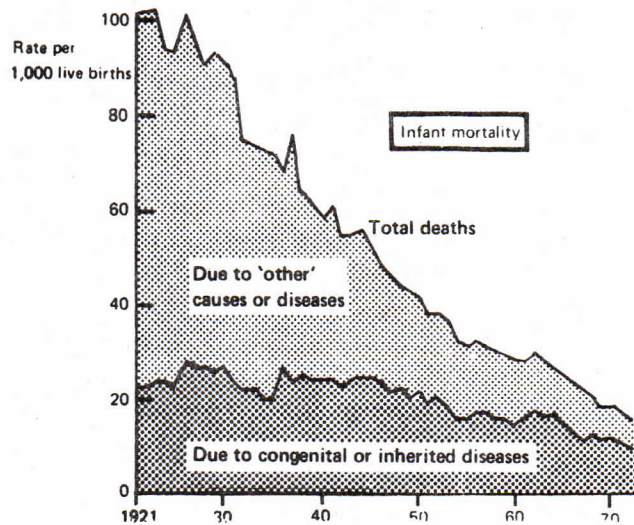
"After this second turning point, the unwanted hygienic by-products of medicine began to afflict entire populations rather than just individual men. In such countries medicine began to sustain the middle-aged until they became decrepit and needed more doctors and increasingly complex medical tools. In poor countries, thanks to modern medicine, a larger proportion of children began to survive into adolescence and more women survived more pregnancies."

We're living longer...

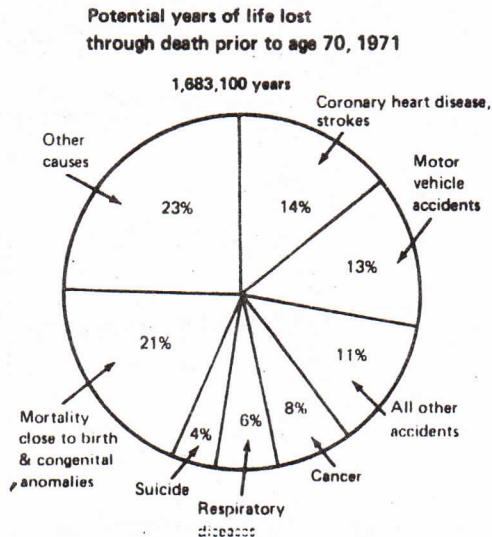
Much of the overall gain in life expectancy since the 1930s...



...is due to a drop in infant mortality and death-causing infectious diseases.



About 400,000 'potential' years of life are lost each year through accidents...



...and suicides, heavily concentrated in some age groups, are on the increase.

