

IS MODERN SCIENCE CLOSER TO RELIGION?

by

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The Seventeenth International Conference on the Unity of the Sciences
Los Angeles, California November 24-27, 1988

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Our times are undoubtedly times of plenty, an explosion of communications and travel has taken place. Technology has affected the way we live and the way we die, the paths of peace and the ways of war. Electronics has made information processing and transmission proceed beyond expectations. Underlying all this is the science base for technology. This is undoubtedly the age of science. Not only is more science research undertaken currently compared to any time in history; but most of the scientists ever born are alive today! Such an explosion of a discipline makes it essential for us to see if science today is truly different in character from science in the past: is there a difference in the spiritual aspect of science? We may need to broadly divide science into classical (pre-Galilean) science, modern (post-Galilean but pre-twentieth Century) science; and contemporary (twentieth Century) science. Among most physicists “classical” usually denotes the second period above (prequantum) but we shall use the above definition.

Science as Culture

In our time science is often (mistakenly) identified with science-based technology and as such science appears to the public generally in its role as high-tech enterprises including space-travel, nuclear reactors and warheads, electronic miracles including computers and the sophisticated weapons of modern warfare as well as its more benign forms in agricultural research and miracle drugs. All these are associated with science but they

*Paper presented at the Seventeenth ICUS meeting “Absolute Values and the Reassessment of the Contemporary World”, Los Angeles Nov. 24-27, 1988

are associated also with commerce and economics and politics.

The one essential quality of science that is often overlooked is its cultural and personal growth potential. Science is primarily an intellectual discipline where vast amount of human experience is brought under control in a systematic fashion. It is a way of life, a continuing endeavor; science continues to accumulate facts and theories each influencing the other. In the process the human intellect is cultured and skilled in the orderly perception of the world around and within us.

The dazzle of the technological artifacts so blinds many an eye that science as a cultural discipline, science as a fine art is overlooked. Many students in other disciplines when coming across an instructor or a course emphasizing the human cultural aspects of science are astonished at the bad press the hard sciences get. We scientists should share the blame for the distorted perception of Science.

I would like to go one step further and point out that science, and particularly so, physics, enables a person to comprehend complex ideas. The domain of intellectual experience is enlarged. Physics provides a greater number of metaphors that can be used in other domains of human experience.

Science also provides a methodology that may be considered in other walks of life. First of all it deals with correlations, using them as a means of penetrating the world of appearances and arrive at the deeper level of happenings. This is not to say that the observed world is an illusion, just that it is an appearance which can be penetrated. Second, science deals with an economy of ideas; sometimes this gets distorted into reductionism (but not really!) but the overriding idea is to reduce myriad facts into a few theories derived from even fewer principles. The principles themselves may change with time but one principle that seems constant is that the world is an orderly understandable place.

Science as a System

Classical science was not so involved with the universality of science. It was concerned with isolated clusters of phenomena and searching for their systematics. Sometimes the explanations bordered on the magical, with revealed knowledge and hidden secrets usurping the place of the painstaking observation-experiment-theory-verification-modification-experiment sequence of developing scientific knowledge. This was partly due to the fact that science was done largely by amateurs and done in isolation. It did not necessarily become a social activity though Archimedes was a “Defense” Scientist. The truly cosmic nature of science must have come with the enchanted period of Kepler, Copernicus, Galilee and Newton where physical laws seemed to encompass and transform the whole universe. The discoveries in life sciences, particularly about the causes and cures of dread diseases had an equally startling effect in changing people’s world view. With the coming of the modern age with the metaphor of “space ship earth” we have come to recognize the ecosystem, society and oneself as dynamical systems obeying laws and subject to general principles. Psychoanalysis with its semi-magical terminology nevertheless attempted to impose causality and lawfulness with the functioning of the mind. Not unwilling to postulate hidden recesses and novel mechanisms to establish this lawfulness it gave protocols for verifying the elaborate theoretical assumptions. The success of psychoanalysis as a tool in therapy gave further impetus to psychoanalysis as a scientific discipline and, in its turn, to psychoanalytic interpretations of literature, art and human functioning in general.

Causality

Newtonian physics, Darwinian biology and Freudian psychoanalysis we may see the common thread of causality. Everything has to be analyzed and its cause investigated.

The apparent diversity in structure and functioning itself has to have an explanation. Some spectacular successes in unification emerged from this determined and principled stand. Newtonian physics unified most of the external universe under the general principles of physical science. It was remarkable that gravitation could unite the falling apple, orbiting of the earth by the moon, orbiting of the sun by planets and comets and even the tides in the oceans. The multitude of species and their biological strategies for survival and duplication could seek an explanation under the theory of evolution.

The success of the principle of causality in the physical sciences was two-fold. First, the detailed working out of the mechanism and systematization of knowledge following Newtonian physics spread to all of physics, parts of chemistry, electrical and civil engineering, construction of industrial machinery etc. Second, the detailed working out of phenomena like those of kinetic beam, viscous flow, heat transfer, electrochemistry, acoustics and so on. Along with engineering technology and industry there was also the contributions to the artifacts of war and national defense. Thus science became associated in the modern era with expansion of human economic and productive activities. It then became desirable and necessary for society to support science. Science ceased to be a private undertaking. This public support and increasing number of practitioners made possible that science was communicated to aspirants in an open and efficient fashion. The number of practising scientists increased exponentially. Science and scientific work came in for notice amongst the people. We may recall that even Newton's contemporary poets had written poems about the spectrum of light, not unlike New York Times or Christian Science Monitor writing news articles on science topics.

This great expansion came at a price. The philosophic roots of science got de-emphasized in favor of the technological fruits of science. And whatever interest there was in science per se was exploited to make the origins of scientific discovery sensational and fictionalized. In turn this devalued the role of science as a means of personal growth.

Science vs Religion

With the increasing success of science and science-based technology conflicts arose between organized religion and ~~and~~ the scientist. While Copernicus who dethroned the earth as the Centre of the Cosmos and Newton who launched modern scientific theory were not harmed, Galileo Galilee was persecuted by the Church. The style of science gave no room for a creator-god to directly intervene in the functioning of the universe. Science's headstrong style is illustrated by the apocryphal story of Laplace making a theory of the cosmos in which God has no place. The trend has continued and the late twentieth century science has combined Laplace's ambition and Darwin's ideas to produce a picture of an evolving universe endowed with no purpose and developing without any specific divine guidance or divine intervention. Man is not necessarily the crown of creation but just one of the products of evolution. Science is no longer antisophomorphic or man-centered.

I must hasten to add that science proceeds by a sequence of cycles. From simple observations one proceeds to controlled experiments based on some theoretical framework. The results of the experiments may strengthen that framework or suggest minor or major modifications in that framework. The newly refurbished theory is used to make new testable scientific predictions which in turn inspires new experiments. In these efforts it is only the simple minded that would assert that the theory suggested is in anyway unique. A different perspective may give a new cognition, a new theory. It does not happen too often: we scientists communicate well with each other and we share our thoughts and make collective critical assessments, until a truly gifted person of independent vision gives a new perspective. But even in such cases it is hardly "revealed knowledge"; rather it is a system painstakingly built up systematically.

The Role of Mathematics

We are all prisoners of our own culture. We find it difficult to think along radically new paths. The very language is beset with thought habits and model building and reasoning in science is restricted by the concepts of the times. The great liberation from their bondage came with the use of mathematics as a tool and as the language of science. Twentieth century physical science is so fully in the language of mathematics that the discoveries and theories of science are difficult to describe in ordinary language. For the serious person admiring science ⁷on sees that science enlarges one's concept structure; and conceptual models of great subtly can be borrowed from the physical sciences.

The increasing number of scientists, the technological applications of science which often masquerade as science, the detachment of the abstract mathematical language from everyday speech, the great complexity of scientific theories and the many years of apprenticeship in the process of becoming a scientist have made science a profession. Contemplation and reflection, philosophic inquiry and artistic inspiration – these have been de-emphasized and even derided. Philosophy is suspect: we do science, not reflect on it!

In many ways science has taken the place of religion in human affairs. It is a high calling, requires learning, discipline and dedication, is respectable; and scientists like clerics of a bygone era are assured of reasonable comfortable living. And like the clergy of an organized religion, good scientists do not speculate, deviate from the norm or rock the boat but get along within the community. The community of scientists as a whole make changes in the collective wisdom but no visionaries are encouraged. This provides for stability and orderly progress. If the majority of scientists feel that the universe is without design or purpose, so be it: it is only a Freeman Dyson who dares to enter a different view, a design for the universe in his book "Disturbing the Universe" in contrast

to Jacque Monod's "Chance and Necessity", Steven Weinberg's "First three Minutes" or E. O. Wilson's "Sociobiology".

Science and Spirituality: Symbiosis or Predation?

Contemporary twentieth century science is rich with conceptual gems: creation and destruction (of particles and excitations), symmetries, spontaneous symmetry breaking, noncommutativity and consequent Heisenberg principle of uncertainties, Fourier transforms and holograms, hidden symmetries, black holes, big bang cosmologies: and so on. t ? At?

the same time there is a philosophic poverty. The spiritual yearning, the search for meaning and the hankering for magic have made many people turn to esoteric philosophies and religions as counterpoints to a scientific world new and a technological civilization.

Into this gap has come some of the Asian religions. (Most religious are asian!) particularly Zen Buddhism and pop-Vedanta. While practice of Yoga, Meditations or Zen has had beneficial effect on many people there was still a relative vacuum in the theoretical underpinning. Into this breach came a new group of science writers who said that contemporary science and esoteric religions are essentially the same. These presentations stretch all the way from quasi-scientific theories of the brain and mind to language games in which creation and destruction of subatomic particles are juxtaposed with myths of creation and destruction of the universe. In the early decades of this century James Jeans wrote very successfully about the newer theories of matter and the cosmos; and many people derived reassurance from the reestablishment of mystery in modern science. Arthur Eddington wrote philosophic analysis of the same discoveries and theories which was well appreciated but it was the pop-Science of Jeans that was the bestseller.

The situation is not very different today. While Monod, Weinberg, Prigogine, Wilson or Hawking are scientists who present a serious philosophic analysis and are

well appreciated, it is the successor of Jeans who are the best known. These writers either juxtapose scientific ideas and esoteric ideas (much like the attractive blonde posing along with the expensive convertible), or they package known philosophic doctrines in “scientific” language. This scientism is to authenticate the philosophical truth. We are told that modern science vindicates and exemplifies certain ancient esoteric doctrines.

One must not take objection to an application of ancient wisdom in the context of modern science. Nor should we object to the replacement of time-worn imageries with modern scientific metaphors. But metaphors are not experience and the fact that they are from science does not endow them with some magical Midas touch. Gifted authors like Joseph Campbell, Mircea Eliade and Ananda Coomaraswamy have demonstrated that retelling parables in today’s idiom can be poetic and illuminating.

Is Science a Spiritual Path?

Does science have a spiritual dimension? The answers are personal. Most scientists see no spiritual dimension. Nor do they feel a personal need for a spiritual path of any kind, they believe that it shows hard-nosed realism to have the courage to deny any such need. Some of them genuinely feel so, others feel that these disturbing questions are for the retirement years; and the majority go along since it is better to march with the crowd. There are a small group of people who do believe that a spiritual path is both desirable and necessary; and that science is an aid in this search.

How could science and a spiritual search? First, science inculcates the work habit of disciplined observation and careful analysis. What is outward directed to the extent it can be inward directed becomes a spiritual discipline. Second, science produces more conceptual models in terms of which one’s experience can be systematized and comprehended. We must recognize that this use of science is different from the use of scientific metaphors in exposition of spiritual doctrines.

Cognition and assessment of patterns, correlations and mechanisms is different for different people. One person may feel that the romance of the celestial objects is tarnished by astrophysics and space exploration; yet another may feel his wonder increase the more he knows of their true nature. Knowing how scattering in the atmosphere induces the color of the setting sun or knowing how twilight or the rainbow come to be does not make them any less enchanting. Being enchanted by a sunset or recognizing the magical quality of twilight depends on the nature of the person, not his knowledge of physical science.

Science and the spiritual search share many characteristics: both are experiential, both involve uncharted domain, both involve personal discipline and dedication: and finally both are creative and joyous. It seems on careful examination that Galileo's observing the constancy of the period of a swinging lamp and Max Planck's discovery that a quantum of energy would explain blackbody radiation have the same quality; and we find its echo in the account of the encounter of Isiah with the Lord.

Concluding Remarks

There are many who say that science has made spiritual search unnecessary. They find the old ways are misleading or irrelevant; and that science provides the sustenance of the spirit. One can but admire such intellectual austerity. But there are others who are not sure: they are not even sure which brand of science is most akin to religion; they then listen to the people who say that contemporary science has rediscovered/ resurrected/ vindicated esoteric ancient science. Apart from the precarious validity of an ancient doctrine which depends on today's science one is also struck by the fact that no clues to the future development of science is forthcoming from these quarters. Sober reflection would suggest that it is the scientific path that is an aid to the spiritual path, not scientific facts or theories.

To those who are not sure I like to retell the story of the young Samaritan girl who asked a similar question to a young Jewish rabbi. She said “Your people say that the right place to worship is in Jerusalem. My people say that it is under the tree on yonder hill. What do you say?” The young rabbi said “The time has come when it is neither; the Lord should be worshipped in heart and in spirit.” I believe this story is still relevant.