

## Science Requires A Human Face

Few amongst us who know and have a feel of the contemporary state of affairs would deny that the entire humanity is in a pile-up on the highway of scientific and technological development. The undeniable fact is that we are involved in a global environmental *Gotterdammerung*, a massive ecological crisis and alienation on account of a runaway, production-oriented technology which has led to the depletion of resources (such as energy, food and water pressure on land and environment, ever-increasing output of wastes, nuclear chemical and biological weapons. Our times have seen far more critical transactions, sharp changes and abrupt discontinuities in human affairs than ever before. As a result we, the inhabitants of the "Spaceship Earth", are fragmented into warring groups and thoroughly lost in the cobweb woven by the so-called scientific progress and development. Even there is no hope for the times to come : predictably we are in the grip of Toffler's "Future Shock"<sup>1</sup>, of a mounting tragedy, a very dismal and bleak picture indeed.

The confusion in this pile-up is confounded by a thick fog of intellectual arrogance and philosophical blindness that has set in over the past few hundred years. The obvious choices in this situation are : (a) Keep driving straight into the pile-up, still following the rules that caused the pile-up ; and (b) stop, take stock of the conditions, and try to disperse the fog before driving on or attempting

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1. cf. Alvin Toffler, *Future Shock*, Bodley Head, 1970.

a major rescue operation. The first alternative leads naturally to making the tragedy still worse. The second alternative is the only sensible choice. The present article is a modest attempt in this direction. By its very nature it is tentative and exploratory—little more than pre-research loud thinking.

### **Optimism in Science Vanishes**

That the Western science, its civilization, and the intellectual frame-work which is its necessary concomitant, has failed mankind is now openly admitted even by the intellectuals of the West itself. There is an ever growing sense of the limits of modernity and scientific progress, found in many a nation around the globe including even the United States. A review of dominant currents of thinking and acting regarding the technological development over the last three decades reveals that something profoundly new is happening today. Development—indeed, the very concept of scientific development and progress—is under attack. Two shibboleths of development unquestioned in the past have come to be challenged. Firstly, it is being asserted that material goods are not worth accumulating : that they are shabby, that they have no ultimate worth. Secondly, it has been forcefully argued that society is not defined by the development process, but that the developmental process tends to wash away the unique characteristics of each society or each civilization. A conflict between traditionalism and modernity is emerging that threatens the very basis of modern scientific ethos. The zero-growth movement, the limits-to-growth movement, the idea of zero growth as a positive good—all assert that there are spiritual values, abstract goods and services quite beyond those resulting from material scientific development. Indeed, the entire direction of the twentieth century science and technological development is in question. The measurement of society or civilization by a gross national product, by levels of industrial output, or by levels of consumptive activity has come under tremendous criticism.

In the 19th century, in the Western world a prevailing faith had developed in the "endless frontier" of modern science; in the scientific method as the best path to dependable truth, in the scientific mind as the ultimate agent for the solution of almost any problem that could be formulated; and in the notion that science and technology promise limitless progress. Technological optimism had become a prevailing frame of mind. Total victory for science and the scientific method was proclaimed by authors and philosophers of science. But now all these claims have been seriously challenged and discredited by thinkers in many quarters. Science.....technology.....progress.....growth.....development.....modernization: this pattern of interlinked ideas, once a central part of the operative value structure of the Western modernized world, is now being widely opposed and deplored. In short, some fundamental ideas about science & technology are being revised presently both by academics, social critics and planners. The idea of progress is being redefined to embrace something more than quantitative growth of goods and services. There is an increased awareness of limits to the capacity of science to resolve social and civilizational problems. And there is growing insistence that conscious guidance should replace indiscriminate proliferation of technology. The rejection of scientific modernism is extending to a re-evaluation of the notion of what constitutes a good world.

I shall substantiate my claim by citing a few eminent writers on the subject. After a lifetime of studying the interactions of technology and civilization, American social critic Lewis Mumford reached a glum conclusion when he wrote: "Nothing less than a profound reorientation of our vaunted technological 'way of life' will save the planet from becoming a lifeless desert." The renowned microbiologist and essayist, Rene Dubos put aside his customary optimism to discount the prospect of technological solutions to contemporary social problems. "Technological fixes", he wrote, "usually turn out to be a jumble of procedures that have unpredictable consequences and are often in conflict with natural forces." From France, socio-

logist Jacques Ellul asserts : "Technique (scientific technique) has become autonomous, it has fashioned an omnivorous world which obeys its own laws and has renounced all traditions."

### **What went wrong**

The sense of the limits of science and the contemporary malaise has structural and methodological no less than historical roots. It is a complex phenomena which requires both analytic clarity and historical specificity. I shall venture to point out at the very outset that the modern science, though a heir to all scientific traditions of the past especially to the works of the great Muslim scientists, is distinctively European. It is an embodiment of the western secular ethos and has its foundations in the western intellectual history. Thus to have in-depth and firm understanding of the nature of modern science, we must examine the philosophical tradition which is the fulcrum of modern science.

Philosophers and scientists separated natural science from metaphysics during the Renaissance in Europe. The intellectual and scholarly tradition which is responsible for the present status of science and technology has its roots in the Enlightenment which by many is considered to be the beginning of modern times. The Enlightenment was the work of the Philosophes—the intellectuals who conceived and perfected it. The philosophes looked at science and exploration not just for new knowledge but also for new attitudes towards knowledge. From science they acquired the sceptical attitude of systematic doubt, and from exploration a new relativistic attitude towards belief and used them as ammunition against traditional norms and values.

The methodological concerns of the Enlightenment derived from the seventeenth century. The intellectual spokesmen of that century—Bacon, Descartes, Hobbes, Locke, Newton—all appealed for a rational standard of truth. The philosophy of the Enlightenment takes up this call, particularly the methodological pattern of Newtonian mechanics and begins to generalise it. This then becomes the basic

epistemological framework of the Enlightenment. However much individual thinkers and scholars agree or disagree with the end results, they are all unified in their framework of knowledge. The new tools of "reason" and "analysis" however, were not only for mathematical and physical knowledge but they were also used by the philosophes to dissect all branches of human endeavour. Such traditional disciplines as politics, ethics, metaphysics and religion were analysed on the basis of reason and logic with a view to ending their perplexities once and for all. The principles which the philosophes attempted to apply were the new scientific cannons of the seventeenth century; there was to be no a priori deduction from "natural" principles without concrete experimental evidence. "This use of observation and experiment", writes Isaiah Berlin. "entitled the application of exact methods of measurement, and resulted in the linking together of many diverse phenomena under laws of great precision, generally formulated in mathematical terms. Consequently only the measurable aspects of reality were to be treated as real—those susceptible to equations connecting the variations in one aspect of a phenomenon with measurable variations in other phenomena. The whole notion of nature as compounded of irreducibly different qualities and unbridgeable 'natural' kinds was to be finally discarded. The Aristotelian category of final cause—the explanation of phenomena in terms of the 'natural' tendency of every object to fulfill its own inner end or purpose—which was also to be the answer to the question of why it existed, and what function it was attempting to fulfill—notions for which no experimental or observational evidence can in principle be discovered—was abandoned as unscientific, and, indeed, in the case of inanimate entities without wills or purposes, as literally unintelligible. Laws formulating regular concomitances of phenomena—the observed order and conjunctions of things and events—were sufficient, without introducing impalpable entities and forces, to describe all that is describable, and predict all that is predictable in the universe. Space, time, mass, force, momentum, rest—the terms of mechanics—are to take the place of final causes, substantial forms, divine purpose, and other metaphysical notions'.

The Enlightenment separated knowledge from values without giving an adverse judgment on the either. The philosophes were in favour of reason ; but they did not throw intrinsic values overboard. Kant, for example, clearly saw in Newtonian mechanics knowledge of the law of the physical universe, but he did not submit the autonomy and sovereignty of man to deterministic mechanics. He separated the domains of physical knowledge and intrinsic values by proclaiming "the starry heavens above you and the moral law within". The philosophies that followed the Enlightenment took the divorce of knowledge and values further.

The nineteenth century heralds the true triumphs of reason in the unparalleled spread of materialism. Positivism and materialism (of which Marxism is a part) and their twentieth century counterpart logical empiricism threw values overboard altogether. In their epistemological framework values are not considered proper knowledge. Utilitarianism declared that the goal, the ideal, of all moral endeavour is the greatest happiness of the greatest number of people. What came to be practised, in fact, was the greatest number of material goods for the largest possible number of people. Industrialisation, which also became the main agent of the environmental devastation, had produced this reality.

Indeed, the thought system of the philosophers of the Enlightenment which became the basis of the technological rationality of the present century, evacuates the metaphysical 'unknowable' from the purview of human thought by declaring either that everything is knowable, or if not knowable, that it is unimportant. The basic procedural assumption made is that all evidence can and must be tested. For the scientific mind, truth has no absolute meaning or ultimate epistemological foundation, no metaphysical substructure to regard truths known to human minds as manifestations of natural essences or divine concept. On the contrary truth is defined as intrinsically relative : there exist truths for a particular time or context, for limited applications or interpretive purposes. In this model of rationality, verifiability and predictive value are the

ultimate criteria of validity. The spiritual aspect of human personality is ignored because it can not be proved by the technique that natural sciences have evolved. The result of all this, as we notice in contemporary civilization, is lack of direction, loss of a comprehensive view of life that transcends temporary interests and ambitions and a complete disarray of moral principles.

#### **New awareness about Methodology.**

Our brief and sketchy excursus into the history of ideas vividly explains why for so long we have succumbed to the notion that human beings can progress by means of a single methodology only, the famous so-called *Scientific Method* and that ensuing from that there is only one type of rationality to be used as the yardstick for determining the validity and scientific respectability of a theory. The idea of only one type of science of nature being possible, through the use of the scientific method, greatly influenced the whole way of looking at the pre-modern sciences, including Islamic sciences. One of the most important conclusions established by Professor Hossein Nasr's pioneering works on Islamic Science, is that there is no single methodology that is used in that science to the exclusion of all other. On the contrary, the Islamic sciences have sought to pursue different methods in accordance with the nature of subject in question and modes of understanding that subject. Muslim scientists have relied upon every avenue of knowledge open to man, from ratiocination and interpretation of Sacred Scripture to observation and experimentation.

In the contemporary western science and philosophy itself the idea of a single, value-free and linear type of scientific methodology has been forcefully questioned by the numerous works on the methodology of science which have appeared over the last decade or so. Instead, the idea of pluralistic methodology—culturally varied alternative strategies—has now gained wide currency among contemporary historians and philosophers of science. Some of them have gone to the extent of even accepting Sacred Scriptures to be integrated into this pluralistic methodology. Most notable amongst

them is Paul Feyerabend.<sup>3</sup> Similarly, a number of professional scientists, mostly physicists, from R. Oppenheimer and E. Schrodinger to Fritjof Capra<sup>4</sup>, have turned to Oriental doctrines in the hope of finding solutions to certain dilemmas and problems encountered at the frontier of modern physics. Viewed as a whole, it can be said that one of the most interesting and significant development to have taken place in contemporary science is the realization that the creative process which has produced that science is far more complex than what has been popularized as the 'scientific method'. The 'official' method of science has been too reductionistic and exclusivist. It acted like a one-eyed giant, bringing with it the characteristic split and blindness which were at once its strength, its torment, and its ruin. In the following lines I shall further elaborate the marked difference between the modern 'official' science and its methodology and the numerous lately suggested nonmodern alternative strategies, which are more genuine, humane, and sympathetic towards peoples' spiritual needs and moral values.

The scientific enterprise following from the separation of knowledge from metaphysics and its method is not, in an important sense, value-neutral but harbours within itself a preferred mode of empirical rationality and particular outlook on efficiency, development and problem solving. Genuine alternative methodological strategies, however, require a non-instrumental handling of indigenous values of a society, a recognition by the social reformers that it is from

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3. See P. Feyerabend, *Against Method*, Verso Edition (1982) p. 30. The whole book, as the title itself says, is an outline of an anarchistic theory of knowledge. The introduction summarizes it as follows: "Science is an essentially anarchistic enterprise: theoretical anarchism is more humanitarian and more likely to encourage progress than its law-and-order alternatives.
  4. E. Schrodinger, *My view of the World*, Cambridge (1964); Fritjof Capra, *The Tao of Physics*, Shambhala, Boulder (1975) and also his *The Turning Point*, Bantam edition (1983) Chap. 9.



within the latent dynamism of a particular indigenous value-system that group development goals must emerge. The normative image of rationality underlying the classical scientific and technological cast of mind is quantitative, cumulative, verifiable and disaggregative, "objective" rather than "subjective". The contrary image supports and sustains moral value-systems: their rationality is more holistic, and stresses subjective perceptions, quality in relationships, linkages, symbols and evocative meanings. This view of rationality does not initially assume that every statement has to be demonstrated or verified to be considered valid. It holds contrary assumptions regarding what is right, reasonable, and meaningful. Unlike the positivistic-scientific methodological principles of knowledge and development which display murderous cultural arrogance and cognitive disrespect for people, theorists like Fred Riggs, Lloyd and Suzanne Rudolph, and Mirrit Boutros Ghali<sup>5</sup> assert that much value destruction is unnecessary: they contend that traditions can coexist with modern practices in societies undergoing change. This approach acknowledges that cultural values and moral notions are essential to people's identity and their sense of meaning, and to their purposeful continuity with life around them. Science and technology must not be idolized as some new Moloch permitted to devour all values standing in its way. Too many modern scholars, following the positivistic philosophy, wrongly assumed that traditional religions and moral values intrinsically possess a low developmental coefficient, an assumption which has been radically questioned. Richard Falk, for one, observes acutely: 'No amount of tinkering can fix up the present international system.....The future prospects of the human species depend upon internalizing an essentially

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5. Fred W. Riggs, *Administration in Developing Countries* (Boston: Houghton Mifflin, 1968), Lloyd and Suzanne Rudolph, *The Modernity of Tradition* (Chicago: University of Chicago Press, Pre 1967ss.); Mirrit Boutros Ghali, *Tradition for the Future* (Oxford, England, Alden Press, 1972).

religious perspective, sufficient to transform secular outlooks that now dominate the destiny of the planet."<sup>6</sup> In a similar vein writers such as William Ophus, Willis Harman, and Herman Daly<sup>7</sup> call for a new piety toward nature and society in their search for values to guide social policy. They have begun to understand what traditional wisdom has always known, namely that holistic posture must be founded on reverence for the universe and for living beings within it.

The new awareness in methodology and science dictates that philosophers and scholars must learn to honour other rationality models besides that inherent in modern science and technology. To be sure, to speak of methodology is to speak of ways or methods by means of which man can gain the knowledge of Reality, either in its partial or its total aspects. Therefore, to speak of methodology is first of all to enquire about man, who is the subjective pole of the knowledge-situation, that is to say the subject that knows. This pole consists of all the faculties and powers of knowing within man, which are hierarchic in nature. In other words, man is capable of having multiple levels of consciousness. Next comes the Universe, which is the objective pole of knowledge, that is to say the object that is knowable and which is also hierarchical. In other words, the Universe has multiple levels of being or existence. The newly suggested pluralistic methodology deals precisely within the essential relationship between the hierarchy of man's faculties of knowing and the hierarchy of the Universe and with the ontological Principle governing that relationship. This means in effect that a metaphysical world-view and teleological resolutions of life are not to be taken as a challenge to the technology necessary to cope with the continuation of the developmental impulse.

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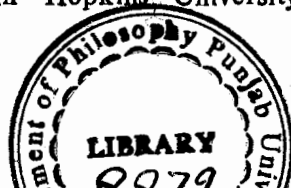
6. Richard Falk, see his article in *World Faiths and the New World Order*, eds. Joseph and William Ryan (Washington, 1978).

7. For a representative sample of such writings see, Dennis Pirages, ed., *The Sustainable Society* (New York : Praeger, 1977).

The exclusivist paradigm of scientific method unnecessarily and illegitimately isolates itself from cosmological and metaphysical ideas, thus depriving social life of spiritual meaning or a sense of teleological purpose. Many traditional metaphysical patterns of rationality exhibit what the French Thomist philosopher, Jacques Maritain, calls "knowledge by connaturality".<sup>8</sup> Knowledge by connaturality cannot be gained by empirical experience or laboratory testing; it is the cognition obtained by poets, sages and mystics in touch with the nature of objects or persons known. Connaturality both presupposes and establishes a high degree of consonance between the knower and the known. Authentic mystics claim to possess knowledge by connaturality through union with the object of their love and contemplation. It is as if their own nature had become divine and the divine nature had permeated their own. The knowledge they possess is neither analytical, empirical, nor amenable to quantitative verification or analytical disaggregation. Mystical union is merely one of the several varieties of knowledge by connaturality; aesthetic knowledge is another. Poets, writers, and creative artists are "at one" with their material as they commune creatively with the world. Aesthetic knowledge reveals latent dimensions of reality not evident to others. Highly personal modes of knowledge like these are not rational, but meta—or extrarational. Moreover, there are strong grounds to believe in Extra Sensory Perception (ESP), the possibility of a dormant faculty present in all human beings by which they can gain knowledge beyond the range of purely sensory experience. Research by Professor J.B. Rhine and other parapsychologists suggests a vast new domain of knowledge beyond the restrictive scientific method.<sup>9</sup>

8. Jacques Maritain, *The Range of Reason* (New York, 1953), especially Part III, "On Knowledge Through Connaturality". pp. 22-30; see also his *Intuition in Art and Poetry* (Princeton University Press, 1953).

9. See Seymour H. Mauskopf and Michael R. McVaugh, *The Elusive Science* (Baltimore: The John Hopkins University, 1980).



The methodology of science in the tradition-oriented cultures like the world of Islam is based on an epistemology that is fundamentally different from the dominant epistemology of modern science, which has remained unaffected by the new realization although an increasing number of scientists, historians and philosophers of science have spoken of the need for a new epistemological paradigm which has a commitment to an enlightened cosmology. Many contemporary writers—Ivan Illich, J.R. Ravetz, Fraser Darling, Hossein Nasr and others—believe that the origin of our global ecology crisis is basically spiritual.<sup>10</sup> They convincingly make a call for the integration of values with and replacement of linear thinking with multi-dimensional approach.

#### **Giving science a human Face**

In the above lines I have made an attempt to examine the fundamentals, dissect—in some historical depth—the assumptions inherent in the prevalent modern science and technology. I have also briefly outlined the utter dissatisfaction which some eminent intellectuals around the world are feeling and freely expressing with regard to science operating as a single-eyed giant devouring all intrinsic values and spiritual perspectives. It is now almost a truism that science has moulded people's mind as much as people have moulded science. The call is almost being sounded for a New science. Modern conventional science has made the condition of its acceptance the rejection of metaphysics and intrinsic values and it is this condition which has alienated man from the total cosmic reality, and has resulted in the atomized, depersonalized, mechanized, world in which we live today. The imperative question in this situation is: How can we regain our lost identity and give science a human face?

10. See Hossein Nasr, *Encounter of Man and Nature*, Allen and Unwin, London 1968, chapter 2, and *Reflections on Methodology in the Islamic Sciences*, in *Hamdard Islamicus*, vol. III No. 3 (1980) pp. 3-13. Also see J.R. Ravetz, *Scientific Knowledge and its social Problems*, (London : Penguin Book, 1973, pp. 424-431).

The answer to this dilemma lies in the new awareness about science and the scientific methodology. One need not revert to a romanticized past. Atavism and "prettifying" can be nothing more than patchwork. The central argument of this essay lies here: nothing short of giving science a human face will achieve the desired results. A facade or a mask will not serve the purpose. Any attempt to humanize science must recognize that our present physical and spiritual crisis is a logical outcome of the worship of shallow empiricism and the divorce of values from knowledge. A marriage between physics and metaphysics would be a timely affair leading science back to nature away from the bogus empiricism which undermines it at present. I, for one, have absolutely no doubt that the traditional metaphysical wisdom can very well perform the task of articulating a unity of meaning for today's world. Wisdom, however, is not naivete, but unity of meaning gained after one has crossed complexity and multiplicity.

