SCIENCE AND MYSTICISM

'The cosmic religious experience is the strongest and the noblest driving force behind scientific research.'
Albert Einstein

The Scientific Method

Science is amazingly disparate – perhaps the most diverse and complex of all human endeavours. The span of scientific study ranges from particle physics to the vast astronomical world of galaxies and beyond, and encompasses virtually every level and scale of phenomenal reality.

The scientific method has been defined as "the careful investigation of phenomena through experimentation and statistical analysis with the aim of confirming or revising accepted knowledge in the light of newly discovered facts." The two major components of scientific knowledge are empirical observation (facts) and theoretical structure and description (theory). Observation and theory interact: theory tells you what to observe and observations test the theory so that it can be modified, if necessary. The facts and theories of science are constantly evolving as new discoveries are made. When a theory is superseded, the new theory does not exclude or eliminate the old theory but rather includes and transcends it. Einstein's theory of relativity did not negate Isaac Newton's theory of gravitation but replaced it with a new theory that included Newtonian mechanics, but also added much more.

Science proceeds by two kinds of logic: *inductive logic* in which general laws are inferred from a given set of observations and *deductive logic* in which specific events are inferred from general laws and principles. Some scientific discoveries are made by the process of induction (e.g. Darwin's theory of evolution); others by deduction (e.g. Einstein's theory of relativity).

Much of scientific research is driven by *hypothesis testing* whereby a conjectural statement of possible fact is empirically tested through the collection of data and statistical analysis. The hypothesis is designed to guide the investigator in the research and helps direct the collection and interpretation of the data. The testing of hypotheses through experiment and statistical evaluation is the foundation of science and the primary determinant of scientific "truth." But an over-reliance on hypothesis testing can lead the researcher to miss important facts and information.

Professor Thomas Kuhn has studied the history of science and identified and described the conceptual frameworks or *paradigms* which are accepted by the scientific community at a given time, only to be superseded by later paradigms which often revolutionize basic scientific concepts. Paradigms have a powerful effect on both the acceptance of fact and the very process of science:

> Paradigms differ in more than substance, for they are directed not only to nature but also back upon the science that produced them. They are the source of the methods, problem-field, and the standards of solution accepted by any mature scientific community at any given time. As a result, the reception of a new paradigm often necessitates a redefinition of the corresponding science. Some old problems may be relegated to another science or declared entirely "unscientific." Others that were previously non-existent or trivial may, with a new paradigm, become the very archetypes of significant scientific achievement. As the problems change, so often does the standard that distinguishes a real scientific solution from a more metaphysical speculation, word game, or mathematical play. The normal scientific tradition that emerges from a scientific revolution is not only incompatible but often actually incommensurable with that which has gone before. (1)

Kuhn argues that science tends to view the work of earlier investigators from the perspective of current beliefs and paradigms, and lack an understanding and appreciation of the fact that earlier generations "pursued their own problems with their own instruments and their own canons of solutions." Like many academic disciplines, science views past developments as a cumulative and linear progression to the state of contemporary knowledge and relative certainty: "The depreciation of historical fact is deeply, and probably functionally, ingrained in the ideology of the scientific profession, the same profession that places the highest of all values upon factual details of other sorts. Whitehead caught the unhistorical spirit of the scientific community when he wrote, 'A science that hesitates to forget its founders is lost'."

Paradigms are limited in scope, precision and applicability and when first enunciated may be based on selected and incomplete data. Although paradigms can be useful guiding principles in the process of scientific discovery, they can also act as an intellectual straitjacket, preventing creative discovery outside predetermined boundaries and formulations:

> Closely examined, whether historically or in the contemporary laboratory, that enterprise seems an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies. No part of the aim of normal science is to call forth new phenomena; indeed those that will not fit the box are often not seen at all. Nor do scientists normally aim to invent new theories, and they are often intolerant of those invented by others. Instead, normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. (2)

The actual process of scientific research relies not only on logic, rationality and quantitative analysis but also on hunches, imagination and intuition. For example, in the mid 19th century, German chemist Friedrich Kekulé described how a series of discoveries came to him in the course of hypnotic reveries or waking dreams. In one famous instance, while nodding in his chair before the fire, he saw carbon atoms dancing in long rows, twisting in snakelike motions. Suddenly one of the snakes seized hold of its own tail, creating a whirling, combining and

recombining motion. Kekulé had discovered the chains and rings that carbon atoms form with each other – one of the fundamental structures of organic chemistry. And, Albert Einstein is widely regarded as one of the greatest scientists in human history, but many of his most profound discoveries were the result of his unusual creative gifts. In a famous "thought experiment" as a youth he imagined himself riding a light wave; so began the line of thought that eventually culminated in the special theory of relativity.

Chance and serendipity also play a role in scientific discovery. Alexander Fleming discovered penicillin by accident in 1928 when he noticed that a culture dish of bacteria had been invaded by a mould whose spores had drifted in through the window of his laboratory. Fleming concentrated the active principle of the mould and named the antibiotic penicillin. Louis Pasteur discovered the principle of vaccination when a culture was accidentally taken from the wrong jar. And the physicist Wilhelm Röntgen, during an experiment on fluorescence, placed his hand between a glass tube and a screen and was startled to see the shadow of the bones of his own hand – and discovered x-rays.

Scientific knowledge is not a linear, cumulative process of gathering facts and advancing theories. In the words of Thomas Kuhn: "An apparently arbitrary element, compounded of personal and historical accident, is always a formative ingredient of the beliefs expressed by a given scientific community at a given time." Creative scientific discoveries and insights are often described as sudden or like a switch: "Scientists often speak of the 'scales falling from the eyes' or of the 'lightning flash' that 'illuminates' a previously obscure puzzle, enabling its components to be seen in a new way that for the first time permits its solution. On other occasions the relevant illumination comes in sleep."

Neurophysiological brain research suggests that the left and right hemispheres of the cerebral cortex offer two quite different yet complementary modes of consciousness and perception. The left hemisphere controls verbal ability and the logical, mathematical, intellectual and analytical capacities of the individual. Its mode of operation is primarily rational and linear. The right hemisphere of the brain controls the spatial, intuitive, creative, artistic and musical sides of the mind. It is holistic and nonlinear in nature. The two hemispheres are joined together by interconnecting fibres called the *corpus callosum*, which allows them to communicate with one another through the transfer of information. This connection allows them to complement and enhance one another's abilities.

Science generally proceeds through reason, logic and analysis – associated with the left hemisphere. At the same time, science could not exist without the intuitive, holistic way of knowing – the domain of the right hemisphere. Some of the greatest creative achievements in science are the products of the complementary functioning of the rational and intuitive modes of knowing. It has been suggested that the interplay and harmonization of the activity of the two hemispheres of the brain represent a balance between the sequential, logical mode and the nonlinear, intuitive mode of knowing and perception.

Limitations of Science

Historians of science have clearly shown that science is based on certain underlying assumptions and a philosophical world-view that is time and culture bound. In this sense science is limited in its approach to discovering the "objective facts" of existence, even though it is unquestionably useful and functionally true in its own domain of empirical expertise and quantitative knowledge. Yet many scientists believe that the scientific method is the only real way to understand the whole of reality; some have even asserted that "non-science is non-sense."

> At any stage of scientific development, certain assumptions about nature are necessary in order to make observations manageable and communicable to others. But that does not mean that externally measurable and quantifiable aspects of nature are all there is to nature or the rest of reality. As Einstein said, "the most beautiful thing we can experience is the mysterious." To insist on one particular view of nature, as is often done in the name of science, is to impoverish nature as well as humanity. The history of science shows that science is not a finished or dead activity that cannot undergo radical changes in its assumptions and procedures. Future science, to the extent it radically departs from present-day science, will naturally have different assumptions and procedures. (3)

In reality, scientific knowledge is incomplete and partial, evidenced by the fact that scientists are continually searching for further knowledge and understanding in their field of study. The scientific method of understanding reality is based largely on a logical, rational, left hemisphere approach that only incompletely describes the phenomenon under study. "Science is narrow and looks through spectacles."

> The scientific method in the study of reality is to view an object from the so-called objective point of view. For instance, suppose a flower here on the table is the object of scientific study. Scientists will subject it to all kinds of analyses, botanical, chemical, physical, etc., and tell us all that they have found out about the flower from their respective angles of study, and say that the study of the flower is exhausted and that there is nothing more to state about it unless something new is discovered accidentally in the course of other studies. The chief characteristic, therefore, which distinguishes the scientific approach to reality is to describe an object, to talk *about* it, to go *around* it, to catch anything that attracts our sense-intellect and abstracts it *away* from the object itself, and when all is supposedly finished, to synthesize these analytically formulated abstractions and take the outcome for the object itself. But the question still remains: "Has the complete object been really caught in the net?" I would say, "Decidedly not!" Because the object we think we have caught is nothing but the sum of abstractions and not the object itself. For practical and utilitarian purposes, all these so-called scientific formulas seem to be more than enough. But the object, so-called, is not all there. After the net is drawn up, we find that something has escaped its finer meshes. (4)

The scientific method is essentially *reductionist* as it expresses the inherent complexity and mutual relationships of objects and events in simpler, lower-level terms based on numbers and rules:

> Science thrives on dualism; therefore, scientists try to reduce everything into quantitative measurements . . . Anything that cannot be reduced to quantification they reject as not scientific, or as anti-scientific. They set up a certain set of rules, and things that elude them are naturally set aside as not belonging to their field of study. However fine the meshes, as long as they are meshes some things are sure to escape them and these things, therefore, cannot be measured in any way. Quantities are destined to be infinite, and the sciences are one day to confess their inability to inveigle Reality. The spiritual is outside the field of scientific study. Therefore, all that the scientists can do is point to the existence of such a field. And that is enough for science to do. (5)

The basic methods of science can be properly applied only to certain classes of phenomena and experience. The scientific understanding of the universe, by disregarding the metaphysical dimensions of reality, may be said to omit an essential element of existence. Science is based primarily on the measurement of 'quantity' while ignoring 'quality' and other more subtle dimensions of reality. Science holds that quantity is fundamental in understanding reality and that all qualities of nature can be expressed and explained in quantitative terms:

> The science which belongs to the intuitive mind and the holistic mode of consciousness can reveal aspects of the phenomena of nature which *must* be invisible to the verbal-intellectual mind and the analytical mode of consciousness. No matter how sophisticated today's institutionalized science may become, or how much further it may be developed, it will still be concerned predominantly with only the quantitative aspects of phenomena, which can be measured and represented by a number. No matter how beautiful, elegant and harmonious the equations may be to the mathematical physicist, the fact remains that the variables in the equations represent quantities. Hence science today is concerned with only one aspect of the phenomena, and there are other aspects which cannot be reached in this way. (6)

The scientific mind tends to ignore those aspects of reality which do not fit into predetermined categories or definitions: "If I can't see it, measure it, weigh it, I won't accept or believe it." The scientific method is valid and effective only in areas of reality and experience where it has a meaningful application:

> The attempt to force the application of scientific ideas and methods in certain areas may be misguided. Science is certainly successful when applied in some definite domains. These are the domains to which its methods apply; that is, repeatable conditions and uninfluenced by the experimenter. However, no conditions are *strictly* repeatable. It is of interest, therefore, that science works at all; it is successful where it is successful! If we are not to be left with a useless tauto-

> logy we can put this another way: it is of the nature of the universe that at least *some* aspects of it a*re* subject to the scientific method. The success of the scientific method when applied, for example, to purely mechanical situations, tells us something of the nature of the universe; it has a mechanical aspect. That is not to say that *all* in the universe is of this character. (7)

Mystical perception challenges the assumption of science that the material world is primary and that nothing exists except what we obtain cognitively through the five human senses. In the words of physicist Max Planck: "That which cannot be measured is not real." Yet there is ample evidence from the findings of science itself that the world of discrete objects and events is an illusion, a function of the particular scale and sensitivity of our perception and time sense. "In spite of all the, to us, miraculous discoveries of science, the universe and the mystery of life in it still completely baffles us. Indeed, as the first enthusiasm of scientific discovery tends to wane, the mystery becomes more, rather than less, insoluble."

Science attempts to bring order to the perceived world by deducing the 'laws' governing the workings of existence and then expressing them in precise mathematical and statistical terms. However, there is a limit to this method as it fails to capture the living, constantly changing, and ultimately unknowable essence of reality or mystery of being. "In the deepest sense, do we really know more than the ancients did about man and the universe? What scientist can say why the sun rises in the east and sets in the west, why crows are black and herons white, why water boils at 100° C and freezes at 0° C., why dogs chase cats or cats play with mice."

> Western science has made nature intelligible in terms of its symmetries and its regularities, analyzing its most wayward forms into components of a regular and measurable shape. As a result we tend to see nature and to deal with it as an "order" from which the element of spontaneity has been "screened" out. But this order is *maya*, and the "true suchness" of things has nothing in common with the purely conceptual aridities of perfect squares, circles or triangles – except by spontaneous accident. Yet this is why the Western mind is dismayed when ordered conceptions of the universe break down, and when the basic behavior of the physical world is found to be a "principle of uncertainty." (8)

Scientific research is based on a statistical analysis of data which assumes certain temporal and organizational characteristics, while excluding other possible patterns or structures:

> Q: Much research is being done in an attempt to show the possibilities of super-normal communication or cognition. All the tests are always subjected to statistical analysis.
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> A: Such efforts as you mention will be unsuccessful in discovering anything of real importance, because what we are involved in has a series-system and a periodicity different in kind from the statistics which you mention. It is useful, however, to look at the innocence of the assumption that everything, in order

> to be significant, must obey a certain set of time and measuring laws. You can measure, by statistics, the occurrence only of those things which come within the limited range of statistics, as you know them – a minor part of the possibilities of calculation, even in this sphere, the sphere of happenings . . . Your statistics are based upon a very limited pattern. So we would call it primitive. You have been reared to observe things moving in accordance with a certain sort of regularity or irregularity. You refine this as much as you can, and then *assume* that nothing has reality unless it can be encompassed within this narrow limit. (9)

One of the cornerstones of the scientific method is the importance given to the concept of the 'repeatable experiment' as a way of determining the reliability and validity of a scientific finding. The pitfall of ignoring this requirement is aptly illustrated by the story of the professor and the carpet – in which the scholarly gentleman incorrectly generalizes from limited data:

> There was once a professor who lost a book and could not find it anywhere. One day he had just taken off his hat and was rolling back a carpet for some reason, when he saw the missing volume on the floor. This lesson was not lost on him. Not long afterwards, someone told him that a valuable ring had been lost. "There is no real problem there," said the professor, "for all you have to do is what I did, which yielded results. Take off your hat and roll back the carpet – then you will find the ring almost at once." (10)

Science builds its knowledge by discovering repeatable phenomena and using them to lead to a general principle, rule or law. But this assumes that the conditions underpinning a given experiment will always hold in other circumstances and time periods, an assumption that is actually contradicted by the findings of science itself. The scientific requirement for 'repeatable experiments' may act as an impediment in understanding certain phenomena of the natural world:

> In the case of the Sufi experience with extra-sensory phenomena, the principle claimed by the Sufis is different. Their investigation shows that the following of phenomena yields diminishing returns. This, they aver, is because the increase in knowledge of localized phenomena cannot be carried out beyond a certain point. The detail, or secondary manifestation, of 'psi,' in their view, actually emphasizes that there is no further progress along that road. The progress comes, rather, by way of the holistic approach. It might be said that the scientific approach has most often been: 'I shall make this phenomenon reveal its secrets,' while the Sufi attitude is: 'Let the real truth, whatever it may be, be revealed to me.' . . . In the latter mode, experience is needed before knowledge can be perceived. In the former, experience provides knowledge. (11)

Underlying Assumptions and World View of Science

The traditional story "The Elephant in the Dark" illustrates the difficulty of approaching higher levels of knowledge by applying limited methods of study. "The whole cannot be studied by means of the parts, and a thing cannot study all of itself simultaneously."

> An elephant belonging to a travelling exhibition had been stabled near a town where no elephant had been seen before. Four curious citizens, hearing of the hidden wonder, went to see if they could get a preview of it. When they arrived at the stable they found that there was no light. The investigation therefore had to be carried out in the dark. One, touching its trunk, thought that the creature must resemble a hosepipe; the second felt an ear and concluded that it was a fan. The third, feeling a leg, could liken it only to a living pillar; and when the fourth put its hand on its back he was convinced that it was some kind of throne. None could form the complete picture; and of the part that each felt, he could only refer to it in terms of things which he already knew. The result of the expedition was confusion. Each was sure that he was right; none of the other townspeople could understand what had happened, what the investigators had actually experienced. (12)

Science is inherently limited in its scope by its underlying philosophical assumptions, which most scientists conveniently disregard in drawing conclusions from their experiments and studies of nature:

> When you consider the approach of science, you find that science directs its attention towards answering the question of *how* things happen; it doesn't really, and with its methods it cannot, try to answer the question *why* things happen as they do . . . Logic can never answer the question of *what things are* in any ultimate sense. Logic is based on certain axioms or assumptions that are taken for granted, on which the whole structure of scientific knowledge is built, but these aren't normally questioned, and people forget that they are no more than assumptions. This is not to say that science is not extremely useful, provided you don't ask it to do more than it can possibly do. (13)

Scientists and scholars assume that they are perfectly capable of formulating relevant research questions in any area of study. They ignore the fact that questions are every bit as important as answers and require a certain preparation and background. "The fact that you can pose a question does not in itself presuppose an immediate answer." Academic thinking and intellectual reasoning put a premium on questioning, interpreting and explaining, but frequently ignore the application of knowledge to the real world. In the words of a proverb: '*Love the pitcher less and the water more.*'

> You have been brought up to imagine that every question has an answer. This is not true. Every question is capable of being answered, but as to whether the answer is valuable is a different matter. You feel that you must ask, have the right to ask, and have the intelligence to understand the answer . . . Learning, knowledge and wisdom are only useful to you if you have the companion capability of applying them in the right quality in the right context of activity. (14)

Most specialists and scientists are unaware of the various levels, range of meanings and extra dimensions contained in even the simplest, most mundane events of life. In order to understand certain aspects of reality, it is necessary to transcend crude assumptions and learn to operate in more refined and subtle ways:

> Questions do not differ in terms of importance, so far as their answerability is concerned. They differ in subtlety and nuance and in other ways. This fact is so repellent to the scientist and scholastic because it implies that he must equip himself to operate in different dimensions when he prefers the safety of assumptions, his 'psychological nest or fortress.' So he trains himself and everyone else to deal in crude assumptions and attempts to fashion a world around them. There is no wonder that unresolved factors keep popping up and plaguing people. I say 'plaguing' because the inconvenient factors are generally labelled as 'aberrations' and so on. Something that does not fit into your lovely plan. This makes it opposed to you. Hence the assumption that such and such a thing Is 'opposed to reason,' 'unscientific,' and so on. (15)

The underlying assumptions, approaches and beliefs of science take many forms:

- Scientists, scholars and intellectuals generally show a bias toward the logical, linear, sequential left hemisphere mode of cognition, at the expense of the holistic or intuitive approaches to knowledge. "Plato's fire-lit cave is a closed system and its prisoners find logic adequate to explain all that they experience. No logic can trigger off the intuitive leap which would suggest to them the existence of a reality greater than their world of flickering shadows."
- Intellectuals and rationalists tend to imagine that all knowledge is contained in books, forgetting that everything which is written down is not the sum total of available knowledge. They assume that the written word has greater validity than something said or experienced. 'Real knowledge' may be contained in a dance, fairy tale, parable, exercise, ceremonial ritual or work of art or architecture.
- One of the basic assumptions of science is the separation of subject and object, perceiver and perceived. The scientist must stand completely apart from the object of study – flower, rainbow, human group – without participating in it, concerned only with the outer manifestation and characteristics.
- The pattern-seeking approach to knowledge seeks to verify preconceptions and freeze or imprison reality into permanent, static categories. Pattern-thinking tries to make sense out of elements which may or may not be actually related. This approach is largely

inadequate because it attempts to apply principles which hold in one area of study to another area where it is not appropriate.

- When scholars and scientists bring fixed assumptions and unconscious biases to the study of new or unfamiliar subjects, they can easily commit the error of 'proof by selected instances' in which data which contradicts their prior assumptions is ignored or disregarded in favour of observations which confirm their preconceptions.
- Systematic study and specialization are only valuable in the fields in which they apply. Experts tend to label phenomena according to their own scale of measurement. '*A donkey can judge thistles but he cannot judge melons.*'
- The 'cataloguing mind' attempts to acquire facts and ideas and force them into some kind of logical and coherent system. The need to define and place labels on things, to fit data into narrow known categories, can be taken to obsessive lengths. "Certain things can be found out by using this method, but not everything."
- A common problem when studying things from an outside perspective is to work selectively with sources and materials, choosing some and ignoring others. Superficial conclusions are reached when only some of the evidence is considered.
- Astigmatism in science is caused by artificially limiting the field of inquiry. "If you encounter data which lie outside an area which you have defined for yourself as containing the only possible data, you will either fail to see it altogether or else will plausibly discredit it in terms of your own prior assumptions."
- The so-called "rational mind" is often restricted by rigidity, lack of flexibility and an inability to absorb new material outside familiar boundaries. Dualistic thinking tends to argue from a fixed position or idea, leading to an "either-or" approach which lacks the flexibility that could resolve and reconcile apparent differences.

Subjective and Personal Factors

The subjectivity, biases, hidden prejudices and personal predisposition of scientists are also limiting factors in the application of the scientific method to understanding reality. Subjective assessments and personal preoccupations must be taken into account in evaluating the objectivity of scientists and scholars. '*The colour of the water seems to be the colour of the glass into which it has been poured.*'

Experts often judge things according to criteria of their own invention and based on their own background and experience, thus imposing arbitrary limitations on the phenomena they seek to study. Science tries to eliminate the 'personal equation' from its methods, but many historians of science have pointed out that this is not always easy: "A scientist's cultural and personal conditioning naturally affects the style and direction of the scientist's inquiry."

Scientists are human and often display many of the same foibles and errors as ordinary untrained lay people. Scholarly and scientific work is sometimes poorly researched, contradictory, distorted and confusing. There is an unfortunate tendency on the part of many to

arbitrarily edit or excise important information and ideas, or else rely on 'rehashing' techniques whereby one expert will essentially copy from another. In other cases scholars and scientists break the basic canons of research, such as 'checking sources,' 'verifying findings' and clearly 'distinguishing between opinion and fact.'

Individuals who are called 'experts' and 'specialists' frequently exhibit ignorance and a lack of any real knowledge. "All human cultures still retain this unbalanced view of the expert: still believing in his infallibility, without having caught up with the abundantly available and frequently demonstrated evidence of his limitations." It has sometimes been said that the so-called experts and specialists outnumber the relatively few real scholars and scientists. '*In countries where there are no horses, donkeys are called horses.*' Some cynics have even suggested that 'expert' is another word for 'ignoramus.'

The assumption of authority by many specialists leads others to think that their reasoning and conclusions must be true and correct. At its worst this results in communication by intimidation or abstruse terminology:

> Then you have the intellectual academician, a man who writes papers in more and more refined areas of his own discipline, and he becomes more and more enchanted or intoxicated by his own rationale or explanation, as a result of which he starts to believe more and more in his own abstractions, and he builds a whole structure of so-called thinking on it. These are the most difficult people to challenge, because if they have built a castle of dreams, they must and will defend it. (16)

Many scientists and researchers maintain a posture of "acceptance or rejection" and oppose or ignore what they do not understand. Polarized belief leads to unthinking rejection by some and equally unthinking acceptance by others. The tendency to be hostile or to look for something to criticize is sometimes called the "need to oppose." Criticism and opposition are legitimate activities when they are honest, objective and grounded in real knowledge. But it is also important to improve the quality of criticism so that it is useful and constructive. "Criticism has to go through these stages: (1) It is impossible; (2) It is possible, but it is useless; (3) It is useful, but I knew about it all the time. Criticism can then stop."

Scientists and scholars can be blinded by dogmatism, concealed prejudices, ideology, bias and insisting on certain exclusive points of view. There is a lack of awareness of the difference between dogmatism or polemic and the communication of information and knowledge. "Fraud, obstinacy, closed thinking, collusion, and many other human failings are not exempted from the scientific community, and the history of science is replete with occurrences of this kind."

Arrogance and parochialism effectively prevent the assimilation of unfamiliar concepts and ideas. "Humility is the acceptance of the possibility that someone else or something else has something to teach you which you do not already know."

> Great scientists understand quite clearly that that which can be known by the human mind is nothing more than an infinitesimal fraction of the actual universe. It is scientific to say you don't understand those things that you don't understand. To rashly deny those things that you don't understand is unscientific. That kind of person is what I call a second-rate scientist. Concerning such things as matters of the spiritual world and supernormal powers as well, they simply conclude that such things are superstitions. (17)

Some scholars and scientists vie and compete with each other, attack other academics and frequently lack a sense of humour. This type of lower level activity is often exemplified by personal vendettas, self-importance and the desire for prominence:

> The self-styled intellectual sneers at the humble man's respect for some things. But if you want to see stupidity clearly and have a firework shown in the bargain, speak against the thinker's sacred cows. You are then more likely to have a demonstration of what 'raving like a maniac' means. (18)

Shallow scholars and researchers often have an inaccurate image of themselves, confusing their own subjective desires (such as the need for attention) with the proper function of re-search and study. When vanity and self-importance gain ascendancy in academic endeavours it may be necessary to point out this predilection in order to protect others. "An erroneous belief about oneself, particularly a fantasy that one is more important than one really is, can have an unpleasant and destructive effect upon an individual and on those who may rely on them."

The Relationship Between Science and Mysticism

Certain ways of thinking, such as specialization and the scientific approach, are beneficial if kept within certain bounds and applied to fields where they work. Logic and reason are useful and effective functions of the human mind when they operate in their appropriate sphere:

> Reason is essential; but it has its place. If you want to have clothes made you visit a tailor. Reason tells you which tailor to choose. After that, however, reason is in suspense. You have to repose complete trust – faith – in your tailor that he will complete the work correctly. Logic, says the master, takes the patient to the doctor. After that, he is completely in the hands of the physician. (19)

Although science is certainly a valid method of inquiry into the nature of things, it is not the only meaningful approach to understanding reality:

> Modern science is not the only avenue to truth. Great spiritual traditions all over the world have other perspectives on reality that are based on direct and intuitive perceptions in purified states of consciousness, which are either ignored

> or denied by science. Among the perceptions achieved in those spiritual traditions is an acknowledgment of levels of being higher than the mind, which can be experienced but cannot be known by any mode of knowledge which separates object and subject. The state of consciousness in which such intuitive insight is possible requires a radical transformation of being brought about by spiritual disciplines. (20)

Throughout the ages and across cultures the world's great spiritual traditions have contributed to the understanding and realization of full human development and potential. Their teachings and practices have preserved and transmitted knowledge and wisdom to future generations much like "a pitcher which contains water which will ultimately provide nourishment to many people." Approaches and contributions to human knowledge and understanding which are altruistic in nature (including science) are always welcomed by genuine mystical teachings and schools. The pursuit of knowledge, whether scientific or mystical, should be objective, selfless and for the benefit of all humanity. "It is a characteristic of true scholarship that honesty and detachment are wedded to a search for truth."

The relationship between science and religion or mysticism should be complementary, not antagonistic. Albert Einstein: "Science without religion is lame, and religion without science is blind." Zen Buddhist teacher Philip Kapleau has a similar sentiment: "Science without a spiritual outlook is barren and socially dangerous. Religion bolstered by science is better able to keep its feet on the ground while its head is in the heavens." Controversies and conflicts between science and mysticism are superficial and secondary in the face of real knowledge and perception. There is a famous Eastern story that illustrates this contention: "The mystic Abu Said and the philosopher Ibn Sina, known in the West as Avicenna, once met. When they parted the sage said: 'What I see, he knows.' The philosopher said: 'What I know, he sees'."

> It is easy to see the unreality of the supposed antagonism between science and religion. Nietzsche was no friend of religion but he set both sides straight when he wrote 'There are questions whose truth or untruth *cannot* be decided by man; all the supreme questions, all the supreme problems of value are beyond human reason . . . To grasp the limits of reason – only *this* is true philosophy.' Some years ago Professor Erwin Schrödinger began his short book, *Mind and Matter*, with these words: 'The world is a construct of our sensations, perceptions, memories. It is convenient to regard it as existing objectively on its own. But it certainly does not become manifest by its mere existence.' Western scientists may have followed a longer and more devious road, but their conception of reality turns out, in the end, to be very much what the Eastern mystic has always said it was. If a man wishes to know more about himself and his perception of the world, he must study his own consciousness. (21)

The apparent opposition between mystics and scientists may be more apparent than real. A saying of Rumi encapsulates this truth: '*Things which are apparently opposed may in reality be working together.*'

> It is a matter of sociological evidence that the people who make the best friends are not those who are attracted to one another, or to each other's ideas, at first. On the contrary, it has been shown that the person who opposes you is likely to become a firmer friend than one who becomes your friend immediately. This may seem odd; it is certainly something which has been known for centuries to thinkers and experimentalists. On the perceptual, as distinct from the superficial level, there is a communication which leads to harmony between nominally opposed people or attitudes. Were this not so, we would never get agreement following disagreement . . . Mystics and scholars seem to oppose one another. But when they know one another's approaches and knowledge, this 'opposition' disappears. (22)

Many of the greatest scientists in human history, although not religious in the traditional sense, have expressed deeply held convictions about the spiritual dimensions of reality. For Albert Einstein, science was a way "of finding the secrets of the Old One." And Louis Pasteur summed up his feelings in these words: "I see everywhere in the world the inevitable expression of the concept of Infinity. The idea of God is nothing more than one form of the idea of Infinity . . . Happy is he who bears a God within and who obeys it. The ideals of art, of science, are lighted by reflections from the Infinite."

Isaac Newton, Albert Einstein and many other great scientists have always approached science as a sacred activity driven by a feeling of awe, mystery, vastness and timelessness, in which the ultimate goal is to comprehend the mysteries of existence and reality. For Einstein, religion "consists of a humble admiration of the illimitable superior spirit who reveals himself in the slightest details we are able to perceive with our frail and feeble minds. That deeply emotional conviction of a superior reasoning power which is revealed in the incomprehensible universe forms my idea of God." And in his book *Ideas and Opinions* he wrote:

> [This feeling] is one of rapturous amazement at the harmony of natural laws, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection . . . The most beautiful thing we can experience is the mysterious. It is the source of all true art and science . . . To know that that which is impenetrable to us really exists, manifesting itself as the highest wisdom and the most radiant beauty which our dull faculties can comprehend only in their most primitive forms – this knowledge, this feeling, is the center of true religiousness. In this sense, and in this sense only, I belong in the ranks of devoutly religious men. (23)

Levels of Knowledge and Experience

Both science and spiritual traditions can deviate from their original intent and degenerate into cults. In the case of science, it takes the form of 'scientism,' a belief that science is

omniscient and superior to all other ways of understanding reality. Science, by its very nature, is incomplete, providing only a partial and constantly evolving description of the workings of phenomenal existence. "Many things accepted as fact by science are hypotheses which fit all or most cases encountered. When new cases which do not fit appear, the 'facts' are changed, and new theories emerge, to be superseded in their turn."

The reality we perceive is only a small part of total reality and, much like the visible portion of an iceberg, masks a hidden reality:

> We have been accustomed all our lives to taking the world of the senses as reality. Now, the moment you begin to learn about what the senses tell you, you can see that it's not reality at all. It's like looking through a tiny slit – whole aspects of life can't be received through the senses at all. You begin to know, if you reflect, that what is most real about life is exactly what is not brought to us by the senses; it is the invisibility behind what the senses bring to us. You may begin to know that this appearance which we feel as reality, which you see all around you, hides a mystery of which you have no idea . . . So much of our thinking, so many of our attitudes are based on this idea that the world as imparted to us through our senses is reality, is the real world, and we have to realize that this is not so. That world is only a *part* of the real world. (24)

There are many levels and gradations of knowledge, each leading to a more comprehensive understanding of reality. The scientist and the academic have been trained or conditioned to operate in only certain limited modes of thinking and perception. "It is difficult for people to credit that, though they may be in one sense refined, this is only a refinement of certain branches of their thinking or even of small parts of their observational capacity."

There is a danger to believing in the complete sovereignty of the human mind and intellect at the expense of other sides of humanness. "When one has a powerful intellect, its ultimate function is to show that intellectuality is merely a prelude to something else."

> Sir Isaac Newton, the father of classical physics, admitted the limitations of the conventional scientific method; and hinted at the Design of Truth: 'I do know not what I may appear in the world, but to myself I seem to have been only a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.' (25)

Science is based on an 'objective' rather than a subjective evaluation and understanding of reality, placing experiment and quantifiable measurement above personal experience. When this approach is strictly applied to human beings much of the richness and subtlety of the higher dimensions of existence are missed. "Scientifically-minded people, and scholars, seek repeatable demonstrations of mystical and spiritual fact *in their own terms*. Because they are looking for things which they can recognize instead of preparing themselves to recognize things

which they are not able to do, they cannot accept the evidence which they cannot see and will not train themselves to see."

> [Scientists] forget the fact that a person invariably *lives* a personal life and not a conceptually or scientifically defined one. However exactly or objectively or philosophically the definition might have been given, it is not the definition that the person lives but the life itself, and it is this life which is the subject of human study. Objectivity or subjectivity is not the question here. What concerns us most vitally is to discover by ourselves, personally, where this life is, how it is lived. The person that knows itself is never addicted to theorization, never writes books, never indulges itself in giving instruction to others; it always lives its unique life, its free creative life. What is it? Where is it? The Self knows itself from within and never from the outside. (26)

Spiritual teachings can only be partially expressed in words and logical concepts and cannot be fully understood solely by intellectual means or theoretical analysis. "Misunderstandings arise when the mentality and methods of scholasticism and linear thinking are employed to approach something which is of a completely different nature."

The purpose of spiritual and mystical teachings is inner development. The exponents of these teachings are involved in the direct transmission of higher knowledge and not secondary academic or scientific pursuits. It is not possible to capture or communicate experiences and perceptions of a higher order in a conceptual framework. There is a Zen saying: "Those who know do not speak; those who speak do not know."

In order to study and benefit from higher spiritual teachings certain approaches and qualifications are necessary:

> The study of Sufism requires a trained observer. In the Western scientific and literary-scholastic traditions, certain minimum capacities are demanded before the observer, student or researcher can be said to be capable of carrying on his investigations. Naturally, these qualifications help in two ways: first, they help to assure others that the observations are likely to be good and sensible; secondly they are the tools which enable the worker to explore his theme and profit from it. In Sufism exactly the same criteria apply. The investigation of Sufism has to be carried out by someone who is himself qualified by having the background which will enable him to research the right phenomena, at the right time, in the right place; enable him to experience what he has encountered, and, ideally, enable him to render this in a communicable form to others. You do not do the watchmaker's job with the bookmaker's tools, and an admirable nuclear physicist may make a very indifferent mechanic or philosopher. Scientific training is needed for scientific investigations. Sufi training is needed for the exploration and understanding of Sufism. This simple fact is obscured by the unconscious assumption that current intellectual and scientific approaches are suitable for all studies; even,

> perhaps, that they are better than any others; even, perhaps, that the thing being observed cannot itself be assumed to have methods and procedures which have been devised for observing it. (27)

Genuine spiritual teachings are sometimes described as 'holistic' or 'organic.' They are comprehensive and experiential, and represent a spectrum of approaches to higher human development that defy simple categorization – there is no common denominator with anything familiar. "Such room as there is for experimentation and 're-inventing the wheel' here is limited and limiting."

Genuine spiritual teachings are operational in intent, designed to cause an effect. Their purpose is self-development and the attainment of wisdom through the initiation of experience and inner understanding.

It is possible to gain advanced knowledge through a form of intuition and direct perception which is independent of logic and intellectual methods. Intuition is a universal mode of direct perception and cognition, inherent although undeveloped in everyone, that can grasp higher aspects of reality. "Einstein and other outstanding men of science have said that their greatest discoveries came, not through logical thinking, but through an intuitive leap."

Spiritual and mystical teachings contain a living, experiential element at their core -- a basic interior source for higher knowledge and understanding. Such inner experiences are by their very nature inexpressible and very difficult to communicate in a logical linear fashion. '*He who tastes, knows.*'

In genuine schools of higher development there is a balance between theory and practice. Experience and participation are essential requisites of higher knowledge, as they are in many other fields of human endeavour. The higher ranges of human understanding and spiritual development require participation-study and direct involvement and experience, not merely external or theoretical evaluation.

Experience is just as valid a part of knowledge as academic learning. Yet a gardener with many decades of experience may be dismissed by a young botanist with a university degree. "It is necessary to participate in order to understand. A phenomenon that we have experienced in our own person carries a complete conviction, which cannot be acquired from academic studies."

The Franciscan monk Roger Bacon, widely regarded as one of the greatest thinkers of the Middle Ages, taught that there is a difference between the collection of information and the knowing of things through actual experience. In his *Opus Maius* he wrote: "There are two modes of knowledge, through argument and experience. Argument brings conclusions and compels us to concede them, but it does not cause certainty nor remove doubts in order that the mind may remain at rest in truth, unless this is provided by experience."

The scientific method, by devaluing personal experience and understanding, is incomplete and incapable of approaching those aspects of reality that are outside the confines of its net of assumptions and philosophical world view:

> Modern science, instead of accepting the idea that experience was necessary in all branches of human thought, took the word in its sense of "experiment," in which the experimenter remained as far as possible outside the experience . . . Scientific thinking has worked continuously and heroically with this partial tradition ever since. The impairment of the tradition has prevented scientific researchers from approaching knowledge by means of itself – by "experience," not merely "experiment." (28)

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