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on Spirit and Science

THE HOLY NOTHING VERSUS THE QUINCUNX OF KNOWLEDGE

IS THERE A RECONCILIATION?

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ABSTRACT

It has been argued that "we need a wisdom that transcends science if we are to have a full view of nature" and that this wisdom may come from Eastern philosophies. It is also said that the mystical

experience may help to restore the harmony between man and nature by providing supplementary modes of human knowledge. Moreover it is suggested that the findings of modern physics "is internally consistent and in perfect harmony with the views of Eastern mysticism."

The purpose of this paper is to examine the validity of these claims. For this reason some aspects of modern physics is discussed with particular attention to the Copenhagen interpretation and recent experimental studies of the EPR-phenomenon. An attempt is made to define the mystical experience and it is argued that while there undoubtedly is such an experience its content is ineffable. Some of the similarities and differences between mysticism and science are reviewed with particular reference to the relation between reality and language. Finally some conclusions are presented.

The problem is, says Seyyed Hossein Nasr in The Encounter of Man and Nature that "the domain of nature has become a 'thing' devoid of meaning, and at the same time the void created by the disappearance of this vital aspect of human existence continues to love within the souls of men and to manifest itself in many ways, sometimes violently and desperately."<sup>(1)</sup>

The reason is the rise of modern science, says Nasr<sup>(2)</sup>:

In order for the modern sciences of nature to come into being, the substance of the cosmos had first to be emptied of its sacred character and become profane. The world view of modern science, especially as propagated through its vulgarization, itself contributed to this secularization of nature and of natural substances. The symbols in nature became facts, entities in themselves that are totally divorced from other orders of reality. The cosmos which had been transparent thus became opaque and spiritually meaningless--at least to those who were totally immersed in the scientific view of nature--even if individual scientists believed otherwise. The traditional sciences such as alchemy, which can be compared to the celebration of a cosmic mass, became reduced to a chemistry in which the substances had lost all their sacramental character. In the process, the sciences of nature lost their symbolic intelligibility, a fact that is most directly responsible for the crisis which the modern scientific world view and its applications have brought about.

Many agree. "What must be immediately apparent is that physical science has abstracted certain measurable quantities from an altogether richer reality, and has concerned itself with these, and these alone, to the exclusion of everything else which is of interest."<sup>3</sup> "We need a wisdom that transcends science if we are

to have a full view of nature." (4)

Today, it is often suggested that this wanted wisdom may come from Eastern philosophies and that mystical experience may help to restore the harmony between man and nature by providing supplementary modes of human knowledge.

Gary Zukav, for example, claims in his highly praised book The Dancing Wu Li Masters (5) that "we are approaching the end of science" which is supposed to mean "the coming of Western civilization, in its own time and in its own way, into higher dimensions of human experience." "According to Zukav (6) "the philosophy of physics is becoming indistinguishable from the philosophy of Buddhism, which is the philosophy of enlightenment."

And indeed physicist Fritjof Capra writes in The Tao of Modern Physics--a bestseller--"that the principle theories and models of modern physics lead to a view of the world which is internally consistent and in perfect harmony with the views of Eastern mysticism." (7)

Another contemporary physicist, David Bohm, says in Wholeness and the Implicate Order that (8)

It is clear that the different ways the two societies have

developed fit in with their different attitudes to measure. Thus, in the West, society has mainly emphasized the development of science and technology (dependent on measure) while in the East, the main emphasis has gone to religion and philosophy (which are directed ultimately toward the immeasurable).

If one considers this question carefully, one can see that in a certain sense the East was right to see the immeasurable as the primary reality. For, as has already been indicated, measure is an insight created by man. A reality that is beyond man and prior to him cannot depend on such insight. Indeed, the attempt to suppose that measure exists prior to man and independently of him leads, as has been seen, to the 'objectification' of man's insight, so that it becomes rigidified and unable to change, eventually bringing about fragmentation and general confusion in the way described in this chapter.

One may speculate that perhaps in ancient times, the men who were wise enough to see that the immeasurable is the primary reality were also wise enough to see that measure is insight into a secondary and dependent but nonetheless necessary aspect of reality. Thus they may have agreed with the Greeks that insight into measure is capable of helping to bring about order and harmony in our lives, while at the same time, seeing perhaps more deeply, that it cannot be what is most fundamental in this regard.

Referring to Bohm's quest for a new physics Zukav suggests that it seems to require "new instruments of thought." But these may already be in existence within the "sophisticated psychologies...we commonly call Eastern religions." (9) "It is ironic," Zukav continues, "that while Bohm's theories are received with some skepticism by most professional physicists, they would find an immediately sympathetic reception among the thousands of people in our own culture who have turned their backs on science in their own quest for the ultimate nature of reality." (9)

The perennial philosophy represents, according to Aldous Huxley-- a modern mystic--a great interconfessional mystical tradition. In Seyyed Hossein Nasr the perennial philosophy has found an eloquent spokesman. The central thesis of his book The Encounter of Man and Nature is summarized as follows (10):

In as much as the loss of metaphysical knowledge is responsible for the loss of harmony between man and nature and of the role of the sciences of nature in the total scheme of knowledge, and by the fact that his knowledge has been nearly forgotten in the West while it has continued to survive in the traditions of the East, it is to these Oriental traditions that one must turn in order to

rediscover the metaphysical significance of nature and to revive the metaphysical tradition within Christianity. If the East is learning by impulsion and necessity the Western techniques of domination over nature, it is from Oriental metaphysics that one must learn how to prevent this domination from becoming sheer self-annihilation.

The purpose of this paper is to examine the validity of these claims. The analysis proceeds as follows:

1. Some aspects of the development in modern physics are briefly reviewed with a particular attention to the "Copenhagen interpretation" of quantum mechanics. It is argued that it has become necessary to reconsider some of the currently held notions about the nature of physical knowledge.
2. An attempt is made to define the mystical experience. It is argued that there is no doubt such an experience but that the content of the experience is ineffable.
3. Some of the similarities and differences between mysticism and science are reviewed with particular reference to the relation between reality and language, and finally
4. Some conclusions of the preceding analysis are presented.

## 1. THE MEANING OF EXPERIENCE IN SCIENCE

Something philosophically significant has happened in modern science. (In this paper the word "science" is used as a synonym for physical science or simply physics. Large and important areas in the social, human and even natural sciences have deliberately been excluded in order to focus the interest on what I consider to be the essential points.) We are currently faced with "a very radical revision of the notion of what a physical theory is supposed to mean, a revision that in turn follows from the fundamental role Bohr assigns to the indivisibility of the quantum." (11)

When science is conceived of as a quest for truth, this is generally understood in a realistic sense. Science can somehow provide true knowledge of autonomously existing objects. Whether these objects of knowledge are material or immaterial is of secondary importance. Realism comes in different ways: perceptual (materialism) and conceptual (idealism). Modern science gallantly embraces them both with equal enthusiasm.

Consider, for instance, newtonian mechanics generally taken to be the epitome of the materialistic view of the world. Yet, in the very beginning of Principia Newton defines absolute space and absolute time:

"Absolute space, in its own nature, without regard to anything external, remains always similar and immovable."

and

"Absolute, true, and mathematical time, of itself, and from its own nature, flows equably without regard to anything external."

Obviously these two concepts of autonomous existence are of an immaterial nature and for precisely this reason they have no sensuous qualities whatsoever. They cannot be experienced, but they do make experience possible. Moreover space logically precedes matter. We can conceive of space void of all material content but we cannot conceive of matter without having some space to contain it. In the same manner time precedes motion, since we can conceive of time without material motion but not the other way round. It is time that makes of motion in space with time possible.

Matter is not the point, what matters is the autonomy of existence.

The other important point about science is its empirism. In science sensate experience, and sensate experience only, is accepted as a source of knowledge. In the scientific community

observation, preferably, but not always, under controlled experimental conditions is universally regarded as the ultimate arbiter in matters of scientific dispute.

The famous paper by Einstein, Podolsky and Rosen<sup>(12)</sup> (EPR for short) opened the debate on the completeness of quantum mechanics. At the very first page Einstein and his co-authors state:

The correctness of the theory is judged by the degree of agreement between the conclusions of the theory and human experience. This experience, which alone enables us to make inferences about reality, in physics takes the form of experiment and measurement.

Bohr could not be in more complete agreement. In his reply<sup>(13)</sup> he writes, also on the very first page:

The extent to which an unambiguous meaning can be attributed to such an expression as "physical reality" cannot of course be deduced from a priori philosophical conceptions, but--as the authors of the article cited (i.e. EPR, TRG's remark) themselves emphasize--must be founded on a direct appeal to experiments and

measurements.

The two points just mentioned imply that science rests on a very peculiar foundation of metaphysics. This foundation is a combination of ontologic realism and epistemic empiricism. It is generally known as scientific realism.

Several objections have been raised. It has been argued, for instance, that concepts which lack all sensuous qualities such as absolute space, absolute time, forces, fields and elementary particles cannot qualify as autonomous objects of existence. Concepts of this nature merely serve as "constructs" simplifying our mapping of external reality like the geographers' latitudes and meridians. Since positivistic attempts to rid science of all nonobservables have miserably failed, the claim of scientific realism to provide true, theory independent, knowledge of an autonomous existence has been questioned.

There is, however, a much more fundamental, albeit subtle, objection. It may be argued that realism and empirism cannot be simultaneously held. In other words, empirical observations may turn out to be incompatible with predictions based on realism! That this, in effect, is an unavoidable consequence of quantum mechanics was first pointed out by Einstein, Podolsky and Rosen<sup>(12)</sup> in the paper cited above, although the authors--as it

turned out erroneously--concluded that their observation indicated a major defect in the quantum mechanical description of the physical reality.

Quantum mechanics appears to predict that under certain circumstances measurements performed in one "local reality" ( $S_1$  say) with the theory of relativity the newtonian concept of absolute time was abolished. The notion of an instantaneous, universal and omnipresent now could no longer be held. And since this is a sine qua non for all forms of perceptual realism the very idea of realism was seriously threatened. It found, however, a humble retreat: local realism which is the expression used here.

According to the theory of relativity cause and effect cannot couple faster than with the speed of light. Therefore anything causally connected with an occurrence at a given location must be present within a sphere centered at the point of the observed effect and with a radius which is equal to the velocity of light multiplied with the time lapsed between the cause and the effect. This sphere is the "local reality." instantaneously affects the situation in another "local reality" ( $S_2$ ) completely causally isolated from the first one. Commenting on this Einstein concluded<sup>(14)</sup>:

One can escape from this conclusion (that quantum theory is

incomplete) only by either assuming that the measurement of  $S_1$  (telepathically) changes the real situation of  $S_2$  or by denying independent real situations as such to things which are spatially separated from each other. Both alternatives appear to me entirely unacceptable.

Bohr undauntedly responded that it makes no sense to speak about observables prior to observation.

For half a century the physicists remained in the fortunate position of being able to combine a pragmatic use of quantum mechanics with a realistic ontology.

But the situation became alarming when it was shown that the predictions obtained from local realism sometimes are different from those given by quantum mechanics. The experimental results now obtained from very careful studies<sup>(15)</sup> are incompatible with local realism. But the agreement with quantum mechanics is perfect!

Unless one is willing to accept some mysterious "spooky" action at a distance, there seems to be no way out, but to abandon realism altogether. The spook must be expected not only to act instantaneously, and in some unknown fashion, but it must, as the experiments have shown, also be thought of as endowed with precognition.

However, according to what has become known as the Copenhagen interpretation of quantum mechanics the answer to the question: "with what does quantum mechanics actually deal?" is simply<16>

It deals not with the properties of micro-objects as such but, rather, with nothing more than the relationships among the observable large-scale phenomena. The phenomena are, however, considered as indivisible wholes, which it would be wrong to analyse, even abstractly and conceptually, as made up approximately of different parts, consisting of various kinds of microobjects. The role of the theory is then regarded as merely the calculation of the probability distributions for the various possible types of phenomena.

Or to use Heisenberg's famous remark<17>: "the mathematical formulae no longer portray nature, but rather our knowledge of nature."

In conclusion we note that both Einstein and Bohr, and all other contemporary physicists with them, have accepted the experimental results as decisive. Neither Einstein nor Bohr were willing to accept instantaneous--"spooky"--action at a distance. Therefore there is no validity in the often heard claim that "the Einstein-

Podolsky-Rosen effect indicates that information can be communicated at superluminal (faster than light) speeds contrary to the accepted ideas of physicists" (18) offering a possible scientific explanation for telepathy etc.

There is nothing mysterious about quantum mechanics unless we insists in retaining the weird notion that objects of our knowledge exist by themselves and by their own nature independent of, and as it were, prior to our knowledge of them. David Bohm says (19):

The same concept (e.g., position and momentum) appear in both classical and quantum theories. In both theories, all concepts obtain their experimental content in essentially the same way, i.e., by their being related to a specific experimental set-up involving observable large-scale phenomena. The only difference between classical and quantum theories is that they involve the use of different kinds of laws to relate the concepts...

As long as we restrict ourselves to computing the probabilities of pairs of events in this way, we will not obtain any paradoxes similar to that described above. In such a computation the wave function should be regarded as just a mathematical symbol, which will help us to calculate the right relationships between classical events, provided that it is manipulated in accordance

with a certain technique, but which has no other significance whatsoever.

## 2. THE MYSTICAL EXPERIENCE

Etymologically mysticism is supposed to come from an ancient Greek verb myein, which had two different but related meanings: to close the eyes and to close the mouth. If this is the case the very word mysticism comprises much of the staggering difficulties encountered when one tries to understand its true nature.

Is there a mystical experience? Is there a mystical experience rather than many different? How is it experienced? What (if anything) is actually experienced? Is it a religious experience? Is it typically Eastern?

It is sometimes said that the mystical experience (if it exists) can be explained in terms of neurophysiology. It has been suggested, for instance, that the mystic uses only the right half of his brain during the experience. Such "explanations" are entirely beside the point. There is no doubt a neurophysiological basis for any experience. The fact that an experience can be accounted for neurophysically has nothing to do with the fact that something has indeed been experienced.

Since "religion" has come to denote almost anything that seems supernatural or held to be of supreme importance it is no wonder that the mystical experience is generally accepted to be of "religious" nature. Yet there are among the mystics sufficiently many non-confessionals to suggest that the mystical experience is not necessarily a religious experience at least not if "religion" is to be understood in the conventional sense as a specific system of belief. However the experience is more likely to be accepted and acknowledged by religious people than by non-believers, who presumably are more likely to explain away what they have experienced or at least to keep silent about it, lest they should be considered--and perhaps even consider themselves--as having been temporarily in a state of mental aberration.

Nor is the mystical experience necessarily Eastern. There are many great mystics in the Western Tradition, including several of our most outstanding scientists, but then not in their scientific capacity.

In trying to understand the nature of the mystical experience we are faced with a problem, the nature of which is perhaps most easily explained by a comparison with what was said about empiricism in the previous section. The point about empirical observation and experimental studies is not the alleged certainty of knowledge about an external "real" world thus derived. The point is that the experiment provides us with a means for

checking the communicability of the words and sentences used in the scientific language<sup>(20)</sup>. By "experimental verification" we do not prove our results to be "true," but we do prove that they can be communicated, i.e. understood and repeated. Such--and only such--words and sentences are accepted as factual by the scientific community.

For obvious reasons, this method cannot, be applied to the cognitive content of the mystical experience. Its intersubjectivity--or communicability--must be secured in some other way if the mystical knowledge is to be accepted on the same footing as what is being derived by conventional scientific means. Since we are left with nothing but the words and sentences used by the mystics the measure of communicability must be wrought out of the language itself.

This is a task which seems to present insurmountable difficulties. Not only because words are used in many different ways: literally, instructively, symbolically, evocatively, expressively and inspirationally<sup>(21)</sup>, but also because these words and sentences have to be understood and interpreted. This requires a thorough knowledge of the language in which the mystic has expressed himself. In addition the hermeneutic means available for the interpretation of texts must be applied with particular skill and care. These requirements exclude most of the mystical texts available from interpretation be it for linguistic

reasons, lack of authenticity, incompleteness, or absence of circumstantial knowledge.

Yet, in spite of the semantic difficulties mentioned, it seems obvious from the evidence at hand that people have had mystical experiences. There is a vast literature on the subject.

Testimonies appear in quite different cultural contexts during the span of thousands of years. The experience is not uncommon even in today's secularized Western world. Some of the mystics are famous men and women recognized for outstanding achievements in literature, the arts and sciences, or in political matters.

Sarvepalli Radhakrishnan (1880-1975) was born in Madras, India. Professor at Oxford University, ambassador and President of India (1962-67), he has written extensively on Western philosophy and on Eastern religion. Radhakrishnan concludes that "mystical experience is a genuine part of human nature and it assumes the same general forms wherever it is developed." (22)

This taken for granted it is obvious that this "genuine part of human nature" is of a non-sensuous quality. Plotinos tells us to "cut away everything" (23) the psychological meaning of which he explains as follows (24)

To separate first, the man from the body--yourself, that is, from

your body; next to put aside that soul which moulded the body, and, very earnestly, the system of sense with desires and impulses and every such futility, all setting definitely to the mortal; what is left is the phase of the Soul which we have declared to be an image of the Divine Intellect...

The true getting-up is not bodily but from the body.

Similar expressions abound. St Teresa of Jesus complained that she had suffered much from not having been able to understand that it is possible to see with something else than our bodily eyes. Eckhart made the same distinction between the inner eye of the soul turned towards the essence of being and our outer eyes beholding creation.

But what is experienced? Eckhart tells us about the vision(25)

All that man has here externally in multiplicity is intrinsically One. Here all blades of grass, wood and stone, all things are One. This is the deepest depth...

...we are not wholly blessed, even though we are looking at divine truth; for while we are still looking at it, we are not in it. As long as a man has an object under consideration, he is not

one with it. Where there is nothing but One, nothing but One is to be seen. Therefore, no man can see God except he be blind, nor know him except through ignorance, nor understand him except through folly.

This "Western" experience is obviously very similar to Hindu samadhi which according to Radhakrishnan(26) implies that

we have sense of immediate contact with ultimate reality, of the unification of the different sides of our nature. It is a state of pure apprehension, in which the whole being is welded into one.

To conclude: people have had--and they still have--mystical experiences. There are reasons to believe that these experiences are of a similar nature. It may therefore be possible to identify a singular mystical experiences ascribing to it certain characteristics. This is in fact a necessary although not a sufficient condition for being able to talk about the mystical experience as something "supplementary to scientific knowledge."

There have been many attempts to achieve precisely this, but the nature of the subject seems to call for a definition in negative

terms. In a recent study a Swedish scholar, Christer Norrman, has suggested the following definition:(27)

mystical experience = def an experience characterized by the following properties: lack of I. sensory perception, II. sense of space, III. sense of time, IV. relationship between subject and object, V. thoughts.

Implicite in this definition is what seems to be the most important aspect of the mystical experience: its ineffability.

Why ineffable? Norrman(28) has identified nine different theories of the mystical experience. Only in one of them, that of Stace in his later period, is it held that the mystical experience is not ineffable, in spite of what the mystics themselves have said. According to Stace the mystic merely confuses ineffability with the paradoxical nature of his experience. Against this Norrman(29) and others(30) have, in my opinion convincingly, argued that there have been many able philosophers among the mystics from St Augustine to Martin Buber. It is unlikely that they have had difficulties with the language without knowing it. Moreover there are many mystics, who do not express themselves paradoxically, but who nevertheless speak of the ineffability of the experience.

What Norrman has called "conceptual ineffability" is particularly interesting from a scientific point of view. According to this theory, due to Paul Henle<sup>(31)</sup>, the ineffability is only apparent. The concepts required to express the experience have not yet been developed. (In Science this situation is well known. Consider, for instance, the central motion of planets prior to the newtonian theory or the studies of heat before the second law of thermodynamics.) Henle has explained his theory by an analogy, which in a slightly modified form may be presented as follows. Suppose we express identity with the algebraic law of commutation such that  $1 + 2 = 2 + 1$ . In this terminology it is impossible to account for the existence of negative numbers since  $2 - 1 \neq 1 - 2$ . Negative numbers are, as it were, "ineffable" simply because our conceptual framework is inadequate.

According to Henle's theory it is conceivably possible to overcome the present ineffability by developing new concept for dealing with the mystical experience. Until this has been accomplished (if it ever will) ineffability seems to be an integral part of the experience itself. This is, indeed, what the mystics and their interpreters repeatedly assure us or to give just a few examples:

Radhakrishnan writes about Brahman<sup>(32)</sup>:

It is not the object of thought or the result of production. It forms an absolute contrast to, and is fundamentally different from, things that are, as is in its way nothingness. It can be expressed only negatively or analogically.

Martin Buber(33) has expressed it as follows:

Sobald sie sprachen, sobald sie--wie es der Rede Vorspiel zu sein pflegt--zu sich sprachen, waren sie schon an der Kette, in den Grenzen; der Unbegrenzte spricht auch nicht zu sich, in sich, weil auch in ihm keine Grenzen sind; keine Vielheit, keine Zweiheit, kein Du im Ich mehr. Sobald sie reden, sind sie schon der Sprache verfallen, die allem gewachsen ist, nur nicht dem Grund des Erlebens, der Einheit. Sobald sie sagen, sagen sie schon das Andere.

In Arrow in the Blue Arthur Koestler(34) writes

In the following sections the contemplative trend will play a quantitatively smaller part than the active trend. This is unavoidable because the "oceanic experience" to a large extent

eludes verbal communication, and attempts to convey it (unless one has the gift of poetic expression, which I have not) tend to fall flat or take a maudlin turn.

According to Plotinus(35): "we can and do state what it is not, while we are silent as to what it is"

### 3. REALITY AND LANGUAGE

If the mystical experience is considered to be inherently ineffable, impossible to account for in any language, what then becomes of the words and sentences actually used by the mystics?

Words may not necessarily have a descriptive function. They can be used by the mystic instructively and inspirationally to guide and encourage the disciple on the way to the mystical experience. In a sense this resembles the scientific use of language.

Scientists describe how to set up and perform an experiment in order to arrive at a certain observation. The ultimate conscious sense impression thus obtained cannot be accounted for in any more fundamental terms: be it the smell of sulphur in a test tube, the click of a counter in a laboratory of nuclear physics or the hazy impression of light on an astronomer's retina watching the sky through a telescope. We maintained above that "sensate experience and sensate experience only...is

accepted...as the ultimate arbiter in matters of scientific dispute." But this statement needs some additional qualifications. It may well be argued that click of a G M counter, as a sensuous impression, is just as ineffable as is the samadhi experience or for that matter the taste of bacon. But there is a subtle difference between sensate experiences in general and the experience obtained through experimental investigations.

In introducing the experimental method Galileo is well aware that as sources of human knowledge the senses are obscure and ambiguous. Yet he argues(36):

Whenever I conceive of any material or corporeal substance, I am necessarily constrained to conceive of that substance as bounded and as possessing this or that shape, as large or small in relationship to some other body as in this or that place during this or that time, as in motion or at rest, as in contact or not in contact with some other body, as being one, many or few--and by no stretch of imagination can I conceive of any corporeal body apart from these conditions. But I do not at all feel myself compelled to conceive of bodies as necessarily conjoined with such further conditions as being red or white, bitter or sweet, having sound or being mute, or possessing a pleasant or unpleasant fragrance. On the contrary, were they not escorted by

our physical senses, perhaps neither reason nor understanding would ever, by themselves, arrive at such notions. I think, therefor, that these taste, odors, colors, etc., so far as their objective existence is concerned, are nothing but mere names for something which resides exclusively in our sensitive body (corpo sensitivo), so that if the perceiving creatures were removed, all of these qualities would be annihilated and abolished from existence. But just because we have given special names to these qualities, different from the names we have given to the primary and real properties, we are tempted into believing that the former as really and truly exist as the latter.

"I am necessarily constrained to conceive of...." This is a strange argument coming from an empirist! But Galileo did not "conceive of" reality. He defined it.

First he made a distinction between what John Locke later called primary and secondary qualities. Primary qualities are those aspects of reality that can be measured by comparison with an external standard--a unit of measurement socially agreed upon. All other--secondary--qualities exist only subjectively in our perception. They have no place "out there" in the external world. Reality is in fact defined as the totality of primary qualities.

The origin of what has later been denounced as "reductionism,"

"materialism" and "scientific imperialism" is no doubt to be found right here in the conception of reality as the measurable aspects of existence and the measurable aspects only. David Bohm<sup>(8)</sup> was right when he referred to measure as "an insight created by man" and warned against the notion "that measure exists prior to man and independently of him" which is precisely the positions which we have called scientific realism. He has also correctly pointed <sup>(37)</sup> out that "the very word 'measure' has come to denote mainly a process of comparison of something with an external standard" and he continues<sup>(38)</sup>

In a way, techniques of meditation can be looked on as measures (actions ordered by knowledge and reason) which are taken by man try to reach the immeasurable, i.e., a state of mind in which he ceases to sense a separation between himself and the whole of reality. But clearly, there is a contradiction in such a notion, for the immeasurable is, if anything, just that which cannot be brought within limits determined by man's knowledge and reason.

But Bohm missed the essential point. It is by reducing itself to the measurable aspects of experience that science makes them effable or comuncicable. The sensous experience of the click of a G M counter is indeed ineffable. But the number of clicks per unit time recorded under well defined experimental conditions can

be communicated. Although the smell of sulphur cannot be accounted for in any more fundamental terms, its presence or absence in a given test tube can be decided by comparison with the smell of elemental sulphur; in other words, by comparison with an external standard--by "measurement."

This is how "objectivity" in science is achieved and this is also all it means. In science measure is always used to denote the extent, dimension, capacity etc. of anything or the determination of such quantities, i.e. measurement. It "measure" is understood to mean "a course of action," measures taken to achieve something it takes on an entirely different meaning.

The superficial similarity between science and mysticism breaks up into a dichotomy:

The scientific language i.e. the mathematical formula do not "portray nature, but rather our knowledge of nature" (Heisenberg) whereas the mystical Reality cannot--by nature of its ineffability be expressed. In short:

The scientific language cannot account for Reality and the mystical Reality be accounted for in any language.

The relation between reality and language needs, however, some further clarification. Meaning in language can be understood in different ways. In the referential theory of language words are supposed to refer to something extra linguistic, something real. Connections between words in the language, and words used to establish such connections, are supposed to correspond to "things" and to connections between "things" in reality. The language "mirrors" the world. Words which do not refer to anything extra linguistic have no real meaning. They tell us nothing. Therefore a proper, precise and prudent use of the scientific language provides nothing but an image of reality.

It is often taken for granted--not least by the scientists themselves--that this is precisely what science and the scientific language is supposed to do: providing us with a gradually improved, increasingly more comprehensive and basically true picture of the world as it really is. In other words: "the domain of nature becomes a 'thing' devoid of meaning" (Nasr<1>).

The referential theory obviously presupposes scientific realism. It is therefore not applicable to modern (physical) science. When "we assume that concepts correctly mirror the nature of reality, we draw conclusions about ontology from grammar" <39>

This must not be understood to mean that in science we are unable to deal with objects not yet discovered or more correctly with

experience not yet encountered. It is indeed possible to make predictions in science. In fact much of the convincing power of scientific explanations stems from the "criterion of practice," from the fact that predictions have often proven to be remarkably correct.

The scientific language must be able to provide more than the totality of communicable human experiences and their interrelations. If we subscribe to the theory of use, rather than to the referential theory, we must prove it possible to make meaningful statements about items we have never experienced--and perhaps never will experience--such as Higgs' particles, Wheeler's wormholes or an inflationary universe. These words function in the scientific language because they are thought of in terms which imply the possibility of scientific observation, directly or indirectly.

Suppose somebody asks: "if the planet Neptune never had been discovered would it not nevertheless exist?" It seems strange to answer anything but: Yes!

But, it could be argued, by the same token Brahman, the One, or Ensof could be thought of as existing although neither of them have been observed by the scientists (or ever will be).

In this case, however, the answer must be: No!

The point is not that Neptune has been "discovered" and Brahman not. The point is that Neptune was thought of as discoverable by scientific means whereas Brahman by its own nature forever dwells beyond scientific inquiry.

It may, however, be argued that Neptune did not exist before the Copernican revolution since there was no place for "invisible" planets in the geocentric system, just as there are no places for phlogiston and instantaneous action at a distance in today's chemistry and physics. Nobody knows, what strange objects who's nature we cannot even imagine, that future physicist may claim are right here and now, at least if physicists continue to be of the realistic brand. But Brahman will not be one of these strange objects--this, at least, we can know for sure.

Just as we must not mystify physics we should not physicalize mysticism. They supplement each other, but in a much more profound way than suggested by Zukav, Capra and others. Presumably this is what Rudyard Kipling--another mystic--meant by his famous words:

"Oh, East is East, and West is West, and never the twain shall meet,

But there is neither East or West, Border, nor breed nor Birth,

When two strong men stand face to face, though they come from the  
ends of the earth"

#### 4. CONCLUSIONS

Richard Hubert Jones cites the Upanishades <40>

...where knowledge is of a dual nature (implying a subject which  
knows and an object which is known), there, indeed, one hears,  
sees, smells, tastes and also touches, the self knows everything.  
Where knowledge, being devoid of effect, cause or action,  
unspeakable, incomparable, indescribable, what is that? It is  
impossible to say.

More explicitly st. Teresa of Jesus testifies: "the soul neither  
sees, hears nor understands, while she is united to God." <41>

R.N. Smart, an authority on mysticism, has arrived at the  
conclusion that the ineffability is simply due to the fact that  
there is nothing to describe. According to Aghananda Bharati <42>  
"there is zero content of a cognitive sort in the experience."

But it must be stressed that this "zero content of cognitive

sort" should not be understood in a negative sense. Koestler assures us that it is "meaningful though not in verbal terms." (43) Norrman expresses himself somewhat more cautiously (21)

even though there is no theory today that shows that it is possible to identify mystical experiences by a scientific method, there is a basis for developing such a theory in the future, at least as far as the non-content-related properties of the experience are concerned. It is, however, doubtful whether it is of interest to research to establish the non-content-related properties of the mystical experience without finding out what the mystic has actually experienced. At the moment the most interesting aspect of the study of mystical experiences, that is studies of the content of the mystical experiences, appears to be excluded from research.

In The Logic of Scientific Discovery Karl Popper (44) points out that "the empirical basis of objective science has thus nothing 'absolute' about it. Science does not rest upon rock-bottom," and he quoted (45) Hermann Weyl and Reininger who said:

"What is immediately experienced is subjective and absolute...;

the objective world, on the other hand, which natural science seeks to precipitate in pure crystalline form...is relative. ...this pair of opposites, subjective-absolute and objective-relative seems to me to contain one of the most profound epistemological truths which can be gathered from the study of nature. Whoever wants the absolute must get subjectivity--ego-centricity--into the bargain, and whoever longs for objectivity cannot avoid the problem of relativism."

Weil

"Metaphysics as science is impossible...because although the absolute is indeed experienced, and for that reason can be intuitively felt, it yet refuses to be expressed in words. For "Spricht die Seele, so spricht, ach! schon die Seele nicht mehr." (If the soul speaks then alas it is no longer the soul that speaks.)"

Reininger

But as Sir Thomas Browne once wrote: "the quincunx of heaven runs low and 'tis time to close the five ports of knowledge." For the remaining twelfths we depend on the seven pillars of wisdom, beyond, above but hopefully also within empirical science.

Stockholm, July 17, 1988

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