KNOWLEDGE: LIMITS AND TRANSCENDENCE

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The very title of this contribution Knowledge: Limits & Transcendence deftly suggests two things, i) that there is a 'limit' as to *what* we can know and *how far* can the range of human knowledge be extended; and ii) that we should also probe into the possible ways of 'going beyond'/'transcending' such a limit. This can be achieved (a) either by invention of new and powerful instruments like, microscope, binoculars, X-ray machines etc., [which extend the range of our experience - the main source of our knowledge]; or, (b) by adopting a *radically different* way of looking at, what may be called, our 'method of knowledge acquisition' [henceforth, '**K-acquisition'**, for short]. I think, of these two, the first one i.e., (i) above, betrays the spirit of *cautious conservatism*, while (ii) betrays the spirit of *forward-looking optimism*. Personally, I have always aspired to inculcate the attitude of *forward-looking optimism* in me, with what amount of success (if any), I don't know. I propose to focus mainly on (ii) above. [It may be incidentally be noted here that apart from (a) and (b) above, there is also a *third* logically possible way of 'going beyond'/ 'transcending' the currently stipulated, pre-assigned limits of '*knowability*', e.g., (c), by developing the power of extra-sensory / *alaukika* perception [=ESP] or, *yogaja pratyakṣa*. The questions of *yogaja pratyakṣa* will be briefly, and only very cursorily, touched upon in my talk.

Before going into the heart of the paper, let me start by asking a few, very straightforward, questions:

1. The limits of '*knowability*': Is it absolute and in principle unchangeable or, is it not?
2. The dividing-line between 'Realism' and 'Idealism': Is it clear and sharp so that there is ***no*** *grey area* of confusion?
3. Is the World, as it is *given* in experience, a true copy/picture of the '*external*' World, as it really is? The 'Realists' claim that it ***is*** so.
4. Does our mind [i.e., our *brain* and the sense organs] *just happen to mirror* the World that we see, or, do they [our *brain* and the sense organs *together*] somehow *create* it, i.e., the World that we happen to 'see' through our sense-experience, (i.e., our '*world-view'*, for short)? According to 'Idealism', it (i.e., our '*world-view'*) is a mind-dependent creative construction.

   My concern in this contribution centers round these *four* questions; and my

answers [like anyone else's] to them would depend on the *assumptions* that are made [by me, or anyone else] in course of giving an answer to any/all of the four questions above. Now, let us go into the topic itself. It should be clear by now that for anyone who maintains, [in response to the first question (=Q: 1)], that the limit of '*knowability*' is absolute and is unchangeable in principle, the very idea of 'going beyond' or, of 'transcendence', in our required sense, would be an impossibility. On the other hand, to take the logical possibility of such 'transcendence' seriously, would be tantamount to admitting that the so-called limit of '*knowability*' is ***not*** absolute i.e., the agreed limits of '*knowability*' is likely to change over time. I consider this one to be a more reasonable option to accept. Let me explain why.

First, think of a hypothetical scenario where a person **X,** is asked to give an 'Yes' or, 'No' answer to the following questions:

a. Is it possible to 'see' what his friend is doing now at a place 1000 miles away?
b. Is it possible for you to 'see' or, to 'photograph' [in total darkness of course] what is going on around you?
c. Is it possible to look *inside* your head and to 'see' the lobes of your *own* brain, without opening your skull?
d. Is it possible for one to 'know' what *thoughts* are presently going on in someone else's mind?

Assuming that X is a man belonging to the 19th Century, before the invention of TV, Night-vision glasses, X-ray etc., the answers given by him to (a), (b), (c) and (d) would definitely be 'No'. However, for a man Y , of this 21st Century, the answers to (a), (b) and (c) would be a definite 'Yes', although about (d), he may not be so sure. With regard to (d), however, it is still quite plausible to think that in future the techniques of EEG and 'brain-imaging' would reach such an advanced level that by hooking up one's brain to a machine we would be able to 'read' his thoughts - 'know' what is there in his mind.

What can we learn from the examples in the above scenario? It is this: The stipulated and commonly accepted 'limits' of 'knowability' at any given point of time, is conditioned by our own collective ignorance at that time. In fact, such a limit is actually defined by our collective ignorance at any given span of time. It follows that since pursuit of knowledge keeps the boundary of knowledge expanding, in course of time, the so-called limits of 'knowability' must change with time too. In short, the so-called 'limits' of 'knowability' cannot be something unchangeable and fixed for ever.

As to the second question [i.e., Q2] about the dividing-line between 'Realism' and 'Idealism', I maintain that there is no, and cannot be any, sharp dividing-line between 'Realism' and 'Idealism'. To put it very briefly and rather bluntly, the difference between 'Realism' and 'Idealism' boils down to this: according to the realists the function of a knowing mind is to faithfully 'copy'/'mirror' a given 'datum' - a segment of an objective reality. Whereas, according to the idealists, the notion of pure datum is an untenable myth. Every

object of our knowledge is inextricably inter-woven with human creativity. It is not always easy to tell where 'copying' ends and 'creativity' takes over. Think of two master painters and two great poets who are asked respectively to capture the glowing beauty of the western sky during a spectacular Sunset. Although the two poems as well as the two paintings are all try to depict the same event [beauty of a spectacular Sunset] yet no one would expect the two poems or the two paintings to be exactly the same. Is there any way to exactly apportion the relative contributions of 'copying' and 'creativity' in the finished end-products viz., the two paintings and the two poems. I doubt that there is or, can be any such way. Nevertheless, since the poems and the paintings are about capturing the beauty of a given Sunset sky, they do share an unmistakable common theme. A type of mutual affinity which, for obvious reasons, I call '*thematic affinity'*.

It is clear now that if the position outlined above regarding the first two questions [Q:1, Q:2] is plausible then it follows as a corollary that (i) the notion of so-called 'limit of *knowability* ' is *non*-absolute, fluid and changes with time, accordingly, (ii) transcendence of such a limit which is prevalent at any given time, is *not* to be considered at all as an impossibility, (iii) the so-called *real* World, is like a creative symphony in which raw experiential data is harmoniously blended by the knowing mind in order to *construct* the objective world of *our* experience. The world [supposedly, lying out there independently of any knowing mind] that we claim to *see*, is as much 'given' as it is a *free creation* of a knowing [human] mind. It follows that to a knowing mind of *non*-human kind, if there is any, the same set of epistemic data would possibly result in a world-view completely different from that of ours. Consequently, (iv) the *ideal* of 'pure objectivity', as held by some realists, turns out to be a *myth* which needs to be debunked [preferably on *experimental* grounds].

The reasoning I have used in response to the first two questions [Q: 1, Q: 2] has been mainly abstract and philosophical in tone. We need something more to give it a convincingly concrete shape. Otherwise, it would hang in the air, the way in which Berkeley's argument did when a critic pointed out that 'Berkeley's argument, though irrefutable, is hardly convincing.' To be 'irrefutable' is quite different from being 'convincing' or, 'acceptable'. This point can be made clear with the help of a nice story. It runs thus: Once there was a philosopher Mr. X, who was a brilliant debater too. He was so good that he would be able to *logically* refute any of his

opponent's view and to establish his own position with impeccable logical cogency. Unfortunately, at a certain age, he lost his mind, turned out to be a 'mad' philosopher and became logically convinced that he himself was no longer a living person but one who is *dead*. However, despite this set back, he still retained his brilliance as a philosophical debater. Various attempts were made by Physicians, Psychiatrists, Counsellors etc., to *cure* him of the insane belief that he was a dead man. Nothing worked. All the arguments to convince him that he [i.e., Mr. X] was ***not*** dead, was *logically* refuted by Mr. X. After making Mr. X to agree on the point that 'Dead men do ***not*** bleed', a daring young Doctor wanted to take shot. He lightly stabbed Mr. X with a small scissors. As blood dripped from the scissors-cut, the young Doctor said to Mr. X, 'You see, you ***are*** bleeding. So, you cannot be dead, after all.' When the Doctor was still basking in the warmth of his conviction that *this* was an absolutely knock-down argument; Mr. X retorted with a smile, and politely said, 'Thank you Doctor for pointing out that *even dead men may bleed*.' Mr. X's response is logically *irrefutable*, for sure, but no one needs to be told that it is *hardly convincing*.

Even if we assume that so far our position has been irrefutable, we still would need a set of *corroboratin*g evidence, in order to show that our two claims viz., a) notion of *pure objectivity* is an untenable *myth*, and b) the *external world* itself [which, we so strongly believe to be mind-independent], is somehow shaped by *our* own creativity, are factually convincing as well. In order to fulfill this requirement I will first list a few recent experimental results from the area of neurophysiology. This will highlight the role played by *creative imagination* in the construction of our view of the external reality, and thereby, will also debunk the myth of *pure objectivity* on the one hand; and will, on the other hand, pave the way for showing that there is no sharp line of demarcation between what is *given/a pure datum,* and what is a created *mental construct*.

Our minds play a creative-constructive role in *representing* the world that is given in experience, such role-playing is not haphazard—it is highly *constrained* by a given set of rules. In short, knowledge-representation of the world [by a knowing mind] is a *rule-bound* activity. The set of in-built rules the knowledge-representation game [=KR-game] is played is called 'knowledge representation mechanism' [=KRM]. Nature of any object of knowledge [*jñeya*, say, **y**] is invariably represented/constructed by the KRM of for a knower [*jñātā*, say, **x**] by the set of in-

built KRM [call it **z**] of **x** [i.e., a *jñātā*]. This entails that the *only way* the nature of **y** [a *jñeya*] can be known by an **x** [a *jñātā*] is through the mediation by **z** [a set of KRM]. Hence, in so far as the *yathārtha-jñāna* of **x** [a *jñātā*] about the nature of **y** [a *jñeya*] is concerned, there is a sort of *nirūpya-nirūpaka/janya-janakatva* relationship between *yathārtha-jñāna* about a *jñeya,* **y** and the set of in-built KRM, **z** [of a *jñātā* **x**]. It follows that the very idea of a *jñātā anapekṣa vastusvarūpa jñāna* has to be a logical impossibility for any *actual* knower [i.e., a *concrete, real* and *embodied* knowing subject (*deha-nirūpita jñātācaitanya*)]. This, if true, would be the last nail in the coffin of '*pure objectivity'* of knowledge before we bury it, forever.

It is now time to take a closer look at the way the set **z** [i.e., the in-built KRM of a knower **x**], works on the sensory inputs **w** [sensory data] of the knower **x** [a *jñātā*], *creatively* giving shape to his [**x**'s] knowledge **K**, *about* the nature of **y** [the *jñeya* concerned]. This amounts to saying that it is imperative that instead of looking at the instances of human knowledge **K,** simply as *binary* relation between **x** and **y**, [symbolizing it simply as '**Kxy**', (as is done in most of the modern writings on the topic of 'Epistemic Logic')] we should look at the real-life cases of human knowledge as instances of a more complex type of *tetradic* [4-termed] relation [in symbols, '**Kwxyz**'], so that the interplay of each one of the four key-factors involved in our knowledge-construction is properly highlighted. Keeping this background in mind, let us look at some of the experimental evidences coming from Neuro-physiology and related fields. Some relevant experimental evidences are cited below.

I. Neuroscientists do not fully understand how the brain manages to extract meaningful information. How the brain can efficiently *synchronize the timing* of spikes to encode information and rapidly solve difficult computational problems. This is because a group of spikes that fire almost at the same moment can carry much more information than can a comparably sized group that acts in an ***un***-synchronized fashion. This research could lead to entirely new kinds of computers. "Neuro-morphic" electronic circuits that mimic these aspects of the brain's signaling network have been designed. [See: 'Neuromorphic Microchips' by Kwabena Boahen. [**Scientific American: October (2005): p-56**]

II. *Timing* of signals being a key part of the code that the brain uses to decide whether information passing through the network is ***meaningful***.

III. Bricks to building timing of spikes: When multiple ganglion cells fire ***almost*** *at the same instant*, the brain suspects that *they* (i.e., the spikes, of having a sort of '***suspicious*** *coincidence'* [**SC**]) are responding to various aspects of the *same* physical object. The brain takes such synchrony due to SC, to mean that the signals are worth noting. [See: **(xi)** below]

IV. Neuronal basis of *context sensitivity*: John Allman [1980] of CIT showed that visual stimulation from *outside* the neuron's receptive field [NRF] can alter its firing rate *in reaction to* inputs from *within* the NRF. This "surround" input puts a neuron's response into the context of the broader visual environment. [Ibid: p-59t]

V. A neuron's *surround receptive field* [SRF] has a dramatic effect on the precision of spike timing. David McCormic, James Mazer of Yale, showed that when neurons triggered only by inputs from the NRF (*no input* coming from SRF), timing of the signals from the neurons (that are triggered by the inputs from the respective NRF *alone*) have a *random* & *imprecise* pattern. As more & more inputs from SRF are allowed in, the firing rate of each neuron decreases, but its spikes gradually get more precisely timed.

VI. Synchronized timing with *each spike* representing *one aspect* of an object [colour, orientation etc.] functions as means of *assembling* an image from component parts. A spike for "pinkish red" fires in synchrony with one for "round contour" and another for "perpendicular upright [non-slant] orientation ↑", enable the VC to *merge* these signals into the recognizable image of a "pinkish upright flower pot".

VII. Spontaneous rhythmic firing of a large number of widely separated cortical neurons at frequencies below 100Hz, is responsible for *coordinating* the many neurons responsible for forming a visual perception of an object [p-59m].

VIII. Patients with schizophrenia/autism show *decreased* levels of gamma band signalling. David Lewis & Margarita Behrens traced its cause to a type of cortical neuron, called 'basket cell', which is involved in *synchronizing* spikes in *nearby circuits*. An *inhibitory/excitatory imbalance* of the basket cells seems to *reduce* synchronized activity in the gamma band.

IX. Schizophrenia patients do not perceive some visual illusions, such as, the tilt illusion, in which a normal person typically misjudges the tilt of a line because of the tilt of nearby lines. [It may be viewed as a sort of insensitivity to a *wider context*.] Similar *abnormalities* in the *pre-frontal cortex* are considered to be responsible for the *thought disorders* that accompany schizophrenia. [**Scientific American: October (2012): p-59**]. From: '*The Language of the Brain'*. Also, *Wisdom of the Psychopaths'*. [**Scientific American: October (2012)**]

Brain-rhythms and states of consciousness:

I. **β**-waves: Have highest frequency-15-40cps[=cycles per second], but lowest amplitude. In our *ordinary waking state*, we primarily experience **beta** brain waves [15-40 cps] which are characteristic of a *strongly* **engaged** mind. A debater would be in high beta state.

II. **α**-waves: Have a lower frequency[8-14 cps], but greater amplitude. During a state of *deep relaxation*, we move to **alpha** waves (8-14 Hz). A person who has **completed** a task and sits down to **rest** is often in an **alpha** state.

III. **θ**-waves: Have a still lower frequency[4-7cps], but much greater amplitude. Ordinarily, we only experience **theta** waves (4-7 Hz) in the brief moments *between waking* and *sleeping*. Theta waves may occur when the task becomes *automatic* due to practice or long habit and mind gets a chance to take it easy, and stays *disengaged* from the task being performed. The *ideation* that can take place during the **theta** state is often a ***free*** flow, and occurs without a feeling of ***censorship*** or of guilt. It is typically a state of very *positive* mental attitude.

IV. ***∂***-waves: Have *ultra* slow (0.5-4 cps) frequency, but *highest* amplitude. The ***ultra slow*** **delta** waves (0.5-4 Hz) occur during a state of *very deep* sleep [*susupti*]. Here the brainwaves are of the greatest amplitude and slowest frequency. They typically center around a range of 1.5 to 4 cycles per second. However, they *never* go down to zero, because, that would mean that you were brain dead. But, *deep dreamless* sleep would take you down to the *lowest* frequency band of delta wave. Typically, **2** to **3** cycles a second.[Cp. samādhi maraṇa]. Yogins who can so control the frequency of the *∂*-waves as

to bring it down *arbitrarily close* to 'zero',[(i.e., ≈0), but ≠ zero] can choose the time of his death. [Cp. The widely reported case of Sri Aurobindo.]

V. Elmer Green of the Menninger Clinic in Kansas City reported out that certain ***yogins*** **could control** their internal states merely through meditation and thought.

VI. Maurice "Barry" Sterman, a Professor Emeritus in the department of Neurobiology, discovered a specific EEG rhythm-state during which the experimental cat, waiting for a reward of food, became absolutely ***still***, though it stayed extremely ***alert***.

VII. Scientists have found that *when* people adept in **meditation** reach a state of *deep* awareness and internal mental **serenity,** the *two hemispheres* of their brain—which ordinarily generate brain waves of *different* frequencies and amplitudes—*become synchronized*, both hemispheres generating the *same* type of brain waves.

Henceforth, I propose to call an approach (like ours) to 'Epistemology', a 'Neo-Epistemological Approach' or, just 'N-E approach'. It needs to be pointed out here that *three* of the basic features that make our N-E approach stand out, apart from the rest of the standard traditional approaches, are as follows:

- First, it starts with the assumption that any knowing-subject is *essentially embodied*. The postulation of a disembodied, abstract and / or transcendent knower-consciousness [as Descartes hypothesized] is inadmissible here.
- Second , 'N-E approach' *stipulates* that for any *embodied* actual knower, all possible ways of *epistemological access* to the real world *mus*t be mediated, through and through , by his / her [i.e., an *embodied* actual knower's] in-built KRM.
- Third, the N-E approach also stands out, in so far as it requires that any serious brand of *epistemic logic* need to treat **'K'** [knowledge-relation] as a ***four***-termed relation [rather than as a simple *binary* relation].

Further, within the framework of N-E approach, *two* of the more important consequences of the assumption [viz., that *every* knower, without exception, is *essentially embodied* (*deha-adhiṣṭhita jñātā*) are (xvii) and (xviii) below:

i) The question of the respective reality-status of the ' *objects*' of experience, that are said to be out there, in the external world, and consequently, the

significance and tenability of the standard idealism-realism *divide* need to be critically re-assessed.

ii) One of the requirements, as pointed out earlier, is that **'K'** [a knowledge-relation] has to be a ***four***-termed relation '**Kwxyz** ', rather than a simple *binary* relation **'Kxy'.** [Supposedly, **'Kxy'** *directly* relates **x** (a *jñātā*) to **y** (its *jñeya*). Had there been such a direct, and *un-mediated* relationship between an **x** (a *jñātā*) and **y** (its *jñeya*), then that would have to leave completely out of consideration, the *essential* role played by the *intervening* factors, such as **w** (viz., the given sensory data) and **z** (viz., the knower's in-built KMR),etc., in the very process of our knowledge-construction. This consideration alone clearly suggests that we need to *critically re-assess* the nature, definition and criterion of acceptability of any *'true knowledge-claim'* [TKC], in a different way - a way which would be significantly different from that of other traditional approaches. Unless, one grants the *possibility* of a direct or ***un-mediated*** epistemic relationship holding between an **x** (a *jñātā*) and **y** (its *jñeya*), the notion of *pure* objectivity must be considered a pure ***myth***. Kant was keenly aware of it but was ***not*** *willing* to give up the notion of a world consisting of purely objective 'reals'. Therefore, he *had to* postulate the notion of a *thing-in-itself* ['Ding-an-sich'.] In a very significant sense, it is *this* problem that led to the controversy between Einstein and Quantum Mathematics [QM], regarding the nature of 'Reality'. [See: Sarkar (2010) in P. Ghose [Ed.] for a discussion of this point.]

Now, ***If*** my re-construction of epistemology, [i.e., Neo-epistemology = **NE**] is *acceptable*, ***then*** the very idea of so-called 'objective reality' becomes primarily an act of 'subjective re-creation' [by the 'knower'] out of whatever we experientially encounter in the world. However, it is to be examined that, is NE an acceptable thesis at all? Supposing that an object cognized is a queer *hybridization* of 'objective' and 'subjective' elements, but still the question remains 'what is the nature of that ***objective*** element *per se*?' This question makes sense neither *within* the conceptual framework of NE [= **CFNE**], nor *within* the conceptual framework of QM [= **CFQM**]. In both contexts, it turns out to be an improper/ill-formed question. Such a question can make sense *only* in the context of **c**onceptual **f**ramework of **c**lassical epistemology (CFCE) or, that of classical **p**hysics. (CFCP)

The **c**onceptual **f**ramework of the **c**lassical physics [= CFCP] *assumes* that **(i)** the system [of objects] around us, that we can observe and measure has to have a *definite* value for any of its measured property, [e.g., its momentum '*p*' or, its co-ordinates '*q*' (position)] even *before* the measurement is *actually* made; and **(ii)** measurement-process does **not** affect the system at all [e.g., a thing would weigh the *same* even when it is *not* being weighed at all]. This is an *assumption* shared in common by both Einstein, and also by classical **p**hysics. Such a view is called 'local realist theory' [= **LRT**].

Einstein [as well as the advocates for **LRT**] maintained that our *ordinary* experience-bound consciousness [which happens to be the very foundation of **CFCP**] is **(i)** *normal* in a clear-cut sense and **(ii)** it is the *ultimate basis* of our world-view. However, ordinary consciousness is "normal" only in the very specific sense of being "statistically most frequent", **not** in the sense of being something which is inherently "dependable" [as the term "normal", is sometimes taken to mean]. Accordingly, when *contrasted* with some *non-normal* consciousness that many people experience in specific circumstances, our current belief about a *rigid, intellect-based* awareness/consciousness turns out to be highly *non*-normal, *non*-standard and also *dubious,* which cannot be simply assumed to be the *ultimate basis* of our world-view.

This last claim can be illustrated with an example from real life: As already pointed out [in (viii) above], the incidence of schizophrenia is traced back to an *inhibitory/excitatory imbalance* of the cortical basket cells, resulting in *reduced synchronized* activity in the gamma band. Now, it is interesting to note that schizophrenia patients *do not* perceive some visual illusions, such as, the *tilt* illusion or, the illusion of *spirals*, etc. In cases of *tilt* illusion, a *normal* person typically misjudges the tilt of a line because of the tilts of nearby lines. In cases of illusion of *spirals*, a *normal* person typically '*sees*' spirals [but the schizophrenic patients *do not*] in a cleverly drawn group of concentric circles. This failure to see what normal people do 'see', may be viewed as a sort of inability or failure to place visual data in a *wider context*.] Similar other *abnormalities* in the *pre-frontal cortex* area are considered to be responsible for the *thought disorders* that accompany schizophrenia. [T. Sejnowski and Tobi Delbruck, 'The Language of the Brain', **Scientific American**, (October, 2012), pp. 54-59. Also see, Kevin Dutton, '*Wisdom of the Psychopaths'*, reviewed in **Scientific American,** (October, 2012), pp. 76-79,] We can

quite pertinently ask here: Is the 'abnormality' of schizophrenic patients [which enables them to *avoid* falling for illusory perceptions] is an '*aberration of normalcy'* or, is it the other way around? May be, the so-called '*normalcy*' of an ordinary man [which causes him to see illusions] is to be considered an '*aberration of normalcy'*, instead. So, who is normal, after all—are 'we' normal or, are 'they' [the schizophrenia patients]? Clearly, the only way out of this bind, is to opt for the view that the notion of '*normalcy*' must be viewed as context-dependent, ***not*** something context-invariantly fixed, once and for all.

On the basis of the above discussion, we may also conclude that the **CFCP** notion of *ordinary* consciousness *must* fail to stand up to the requirement that it should be able to act as the *ultimate basis* of our world-view.

In contrast to the conceptual framework of Classical Physics [**CFCP**] as outlined above, the conceptual framework of QM [= **CFQM**], *rejects* both of the two assumptions of **CFCP**, and maintains instead, that—

a. *Without* an observation, assigning a 'value' to a dynamical variable makes no sense in CFQM.
b. Initially, when a QM system is in a state $|\Psi 1>$, it is a ***mixture*** of ***potentialities***. There *is no* [objective] quantum world. [This is Bohr's Copenhagen Interpretation]. According to Einstein, there *has to be* such an objective quantum world, in order for QM to be true.
c. About *potentialities* Heisenberg says, "Atoms or elementary particles are *not real*; they form a world of potentialities, rather than one of things or facts." Until measured, an electron is neither here nor there; until then we cannot even *think* that the electron has a definite momentum [p] and a definite coordinate [q]; till that instant it does ***not*** make any sense to talk of a *reality*.
d. In CFCP on the other hand, one has, what is called, ' *objective reality*' [independently of the process of measurement], whereas in QM, the ***actual*** state of **existence *depends*** , in part , on how ***we*** observe and what ***we*** choose to observe [e.g., 'single slit' or, 'double slit' experiment]. In contrast to Einstein's LRT, the QM-characterization of so-called '*objective'* reality may be called '***non***-local ***anti***-realist theory [= **NLAT**]. [Here, 'anti-realism' must **not** be taken to mean (or, to entail) '*idealism*', in any of its forms.]

Thus, the Bohr-Einstein controversy boils down to the question: 'What is ***objective*** reality?' In other words, the controversy boils down to the question whether LRT or NLAT offers a better model of 'objective reality'. By our commonsense criterion—locality [**L**], Independence [**I**], and experimental accessibility [**E**], are the marks of objective reality. LRT seems to fulfill *all three* of these conditions, and as such, LRT looks more plausible, at least to our '*raw intuition'*. But how reliable is it, after all? Not unquestionably reliable, for sure. We have already shown it in the context of the fact that schizophrenia patients [unlike ordinary 'normals'] are, so to say, '*immune*' to certain types of visual illusions. It may be argued by some that simply because ordinary perceptual experience [and knowledge-claims based on it] are subject to contextual vicissitude of the kind mentioned, scientific theories need ***not*** be so. Hence, NE theory can have only a limited applicability. In response, it needs to be pointed out that every scientific theory consists of *two* components: **(i)** a data based experiential component, and **(ii)** an interpretive creative component. Of these two, **(i)** is exactly at par with ordinary experience, and so, subject to the same set of constraints as are imposed by the NE theory on ordinary perceptual experience. So far as **(ii)** is concerned, it aims at constructing a pragmatic-cum-formally elegant system. Pragmatism requires that a formally elegant theory is not good at all, unless it *coheres* with or fits in with the existing corpus of knowledge. Usually, pragmatism gets priority over formal elegance, but not always; in particular, when 'tinkering' with the existing corpus of knowledge ensures a better *pragmatic* outcome. In the context of Einstein's objection against QM, and the impasse caused by EPR paradox, Bell's famous *inequality theorem* is a case in point. Bell's theorem indicates **(a)** a way to experimentally determine the acceptability of one of the two theories over the other; and (**b**) it also indicates the possibility of dropping out the ***locality*** **requirement** [= L] of LRT. So, it supports the postulate of *'non-locality'*. This postulate [together with some subsequent experiments] lead to the idea of a queer phenomenon called quantum entanglement' [=**QE**]. As the hypothesized phenomenon of 'quantum entanglement' violates requirement of 'Locality', it is clearly ***in****compatible* with **CFCP**. Prior to the advent of QE, non-locality [i.e., possibility of non-causal, instantaneous connectedness of two phenomena] was ***not*** a part of the existing corpus of scientific knowledge. QE is a clear instance where theoretical necessity brought in a change in the existing corpus of scientific knowledge.

Indispensability of a data-based experiential component [in any scientific theory], Bohr-Einstein controversy regarding the nature of 'reality', and changeability of the existing corpus of scientific knowledge itself, all these go to show that scientific theories are no less context-dependent and no less subject to the constraints [as imposed by our in-built KRM, as per NE theory], than an ordinary perceptual experience.

So far, I have highlighted the so-called '***limits***' of standard models of epistemology. Now, it is time to focus on the possibility of going beyond or transcending the *conservative* framework of our proposed model of Neo-epistemology [=NE-model, for short] itself. Earlier in course of my talk, I claimed that according to the NE-model, the notion of 'pure objectivity', free of all KRM constraints, is just a ***myth***. But, is this claim un-falsifiable, even in principle? I doubt that it is. I will cite some of my highly speculative [and yet, technologically quite plausible] conjectures regarding the logical possibility of transcending limits imposed by currently standard models of epistemology.

I suppose, most epistemologists would agree with Husserl's view that 'all consciousness must *invariably* be an instance of "consciousness ***of*** something." This entails that the notion of an *object-free*/ *object-less* consciousness is a vacuous idea—a veritable *impossibility*. In contrast, in Indian philosophy we often find notions like *nirviṣayaka caitanya'* [of the Vedāntins], '*kalpanāpoḍham jñānam'* [of the Buddhists], '*kevala- jñana'* [of the Jainas] etc. Each one of these is a close analog of an *object-free*/ *objects-less* consciousness. They are considered not only non-vacuous, but are considered paradigms of epistemic '*infallibility*'. Clearly, an epistemic model that can accommodate such a possibility should be considered a '*model*' [a '*model*' in its technical sense, ***not*** in the sense of an 'ideal'] for going beyond / transcending the *conservative* frameworks of epistemology. Does NE-theory fit the bill? In a way, it does. Under the 'Heading': Brain-rhythms and states of consciousness, I pointed out the following: First, in our *ordinary waking state*, we primarily experience brain waves [15-40 cps] which are characteristic of a *strongly engaged* mind. A debater would be in high beta. Secondly, waves occur when a task becomes *automatic* and the knower stays *disengaged* from the task being performed [*viz*., the act of knowing]. In fact, in such a ***dis****engaged* state, the brain waves would subside to a minimal level. Thirdly, the ultra ***slow*** waves (0.5-4 Hz) occur during a state of *very deep* sleep

[*susupti*]. Elmer Green of the Menninger Clinic in Kansas City reported that some ***yogis*** could **control** their internal states merely through *meditation*. They can control the *frequency* of the ∂ -waves so as to bring them down *arbitrarily close* to 'zero'. Fourthly, *when* people, adept in *meditation* techniques, reach a state of *deep* awareness, a state of internal *mental* ***serenity*** is attained. During such states, the *two hemispheres* of the ***yogi***'s brain (which ordinarily generate brain waves of *different* frequencies and of *differen*t amplitudes) *become synchronized* and start generating the *same* type of brain waves. Fifth, neurobiologists discovered a specific EEG rhythm-state during which the cat, waiting for a prey/food as a reward, became absolutely ***still***, though extremely *alert* [like the cat, in our example]. In view of these findings it would not be unreasonable at all to surmise that a yogi may be able to acquire, through meditation , such an intense power of' *disengaged* focusing', which enables him to stay *acutely alert* [of an object], without thereby 'being *engaged*' in any way, to it. Such a state of *disengaged* awareness [presumably, free of the trammels of KRM] would possibly be a close analog of, what is called, '*nirviṣayaka caitanya'*. The NE-model keeps this possibility *logically* open. Let us consider another *theoretical* scenario of 'mind-reading 'or, 'telepathy'. It is ***not*** logically impossible that a yogi who can control the frequencies of his brain rhythms, may also control them [i.e., the brain rhythm frequencies] so as to *tune-in with* the specific brain rhythm frequencies of someone else [in about the same way in which the '*tuner*' in a radio receiver *tunes-in with* a specific broadcast frequency]. This *tuner*-model can be easily allotted a slot within the framework of NE-theory, without any hitch. It is easy to see that a suitably augmented NE-model , along the line suggested above, would be able to accommodate such ***paranormal*** phenomena as telepathy, *antaryāmitva* etc., within its framework, and thus would *transcend* the boundary of standard epistemological models. It is interesting to note that some well-reputed research institutes over the world are actively pursuing serious research in many such *non-traditional* areas.

I sincerely expect that this paper would be able to act like an outline-plan, drawn on a clean grid-paper. Many of the contributions to be publishrd in this volume, would address one or the other of the issues that I have indicated, giving thereby, a concrete shape to it. Finally, we move on to **alpha** waves (8-14 Hz). A person who has **completed** a task and sits down to **rest** is often in an **alpha** state. Theta waves

may occur when the task becomes *automatic* due to practice or long habit and mind gets a chance to take it easy, and stays *disengaged* from the task being performed. The ultra ***slow*** **delta** waves (0.5-4 Hz) occur during a state of *very deep* sleep [*susupti*]. Yogis who can so control the frequency of the ∂-waves as to bring it down *arbitrarily close* to 'zero', [(i.e., ≈0), but ≠ zero] can choose the time of his death. Elmer Green of the Menninger Clinic in Kansas City reported out that certain **yogis could control** their internal states merely through meditation and thought. When people adept in **meditation** reach a state of *deep* awareness and internal mental **serenity,** the *two hemispheres* of their brain, which ordinarily generate brain waves of *different* frequencies and amplitudes, *become synchronized* both hemispheres generating the *same* type of brain waves. [Seeing '*the* Moon' vs. seeing *two* 'Moons' ← (non-independence); 'mirage' ← (non-encounterabililty, Cp. 'arthakriyākāritvam sat'), 'identical twins' ← (non-locality) analogy.]

Modus Tollens, EPR paradox and Einstein's objection against QM, Non-locality & Q Entanglement [**QE**], Bell's inequality, Einstein's final position: he stopped arguing that QM was wrong, instead, he decided to attack QM's ***rejection*** of ***objective*** reality. [Bell's famous *inequality theorem* **(i)** indicates a way to experimentally determine the acceptability of one of the two theories over the other; and (**ii**) indicates the possibility of dropping out the ***locality*** **requirement** [= L] of LRT. So, it supports *'non-locality'*. This and some subsequent experiments lead to postulate a queer phenomenon called 'quantum entanglement' [= **QE**] which is clearly ***in****compatible* with CFCP and thus also with LRT which stands on it.

The state of ordinary consciousness, [and it ***is*** the very foundation stone of CFCP] wherein we *assume* the physical world is the only reality and have no interest in deeper aspects of reality, is the *norm* in the world today. So we now assume that our narrow, tightly-bound consciousness is normal and natural. "Ordinary consciousness" is "normal" only in the strict sense of "statistically most frequent," **not** inherently "good" or "natural" as the term is sometimes misconstrued to mean. When *contrasted* with *non-normal* consciousness experienced by some people in specific instances, our current belief about *rigid, intellect-based* awareness/consciousness turns out to be highly *non*-normal, *non*-standard and also *dubious*.