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Y O U T H   S E R I E S

*MY IDEAS, MY SPACE*

The three constants of Nature that control all phenomena in the Universe:

$G$  = Gravitational Constant. } Newton  
 $h$  = Planck Constant } Planck  
 $c$  = Velocity of light } Einstein

These give us

- (i) Planck Mass =  $M_p$
- (ii) Planck Length  $L_p$  = Compton wave length of  $M_p$
- (iii) Planck Time =  $t_p$
- (iv) Planck Density =  $10^{94}$  gms/cc.

$$M_p = \left( \frac{hc}{G} \right)^{1/2} = 10^{-6} \text{ gms}$$

$$L_p = \left( \frac{Gh}{c^3} \right)^{1/2} = 10^{-33} \text{ cms}$$

$$t_p = \left( \frac{Gh}{c^5} \right)^{1/2} = 10^{-43} \text{ seconds}$$

$G = 6.67 \times 10^{-8} \frac{\text{dyne} \cdot \text{cm}^2}{\text{g}^2}$  ( $g = \text{gms}$ ) ( $1 \text{ dyne} = 10^{-8} \text{ N}$ )  
 (erg =  $10^{-7}$  joules)

$h = h/2\pi$ ,  $h = 6.625 \times 10^{-34}$  Joules-Second.  
 $\hbar = 1.0545919 \times 10^{-34}$  Joule Sec =  $1.054 \dots \times 10^{-27}$  ergs  
 =  $1.054 \dots \times 10^{-27}$  ergs

$c = 3 \times 10^{10}$  cms/sec

Planck Density =  $10^{94}$  gms/cc

Compton wave length =  $\lambda_c = \left( \frac{h}{m_0 c} \right)$

electron mass	$4.80325 \times 10^{-10}$	esu
electron charge	$1.6021917 \times 10^{-19}$	Coulomb.
electron mass	$9.109558 \times 10^{-28}$	gms
Proton mass	$1.6726 \times 10^{-24}$	gms
Neutron mass	$1.67493 \times 10^{-24}$	gms

• Every process in nature is quantum mechanical. However, for certain of them - the  $\hbar$  called classical mechanics is applicable since the energy transactions involved are not close to  $\hbar$ .

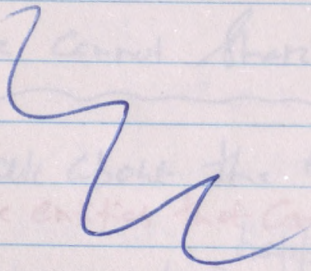
It is the value of  $\hbar = 10^{-28}$  erg s. It has determined that process on QM and that process need not be governed by the laws of QM for calculated purposes.

So until it is proved that consciousness can be explained by classical physics, it cannot be ruled out as QM process.

There are certain other challenges in treating it as QM process.

• The origin of the Big Bang theory is considered to be a Quantum Fluctuation. - ~~in a false vacuum~~

True vacuum  $\rightarrow$  false vacuum  $\rightarrow$  true vacuum.



What are the entities that constitute the world?

• We understand the external world in terms of certain concepts which we become familiar in the process of growing up.

• These concepts are: Space, Time, Matter, Radiation, Motion, Force, Energy, Mass, Causality.

• These common sense ideas were basically the same two thousand years ago when modern science began. They had been put into shape by quantifying them, defining limits, and

## Reality, Oneness and Consciousness

①

- The most distinguishing feature of human beings is Curiosity and the quest for understanding (the happenings) in the world around us.   
 (how things happen)
- This understanding comes from the <sup>Variety of</sup> knowledge that is acquired through experience of interacting with the world as part of daily life, through learning, through reading and through discussion with others. There is a part that is genetically inherited. (a priori knowledge)
- There are two aspects to the world. One is the external world that we become aware of through our senses -   
 of eyes, ears, skin, tongue } - <sup>and through other sense organs - mouth, touch.</sup>   
 This experience can be shared with the others. The other is the experience of the inner world - thoughts, feelings, sensations etc. which we cannot share with the others.

②

- Let us talk about the external world first.   
 What are the entities that constitute the world?   
 happenings in the
- We understand the external world in terms of certain concepts which we become familiar in the process of growing up.
- These concepts are: Space, time, matter, radiation, motion, force, energy, reason, causality.   
 (not all)
- These common-sense ideas were practically the same two years ago when modern science began. They were taken over into science by quantifying them, defining units, and

rendering them suitable for "Measurement" and mathematical formulations on the basis of results from observations, predictions and verifications. In this exercise certain laws of Nature had been recognized and they have incorporated into the theoretical formulations

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- Actual measurements with precision instruments enabled the determination of some of the Natural Constants of Nature (3)

To begin with in the period early to 17th Century →

→ Motion - Linear, ~~Accelerated~~ Accelerated, Oscillatory became an important criterion for explanation of many phenomena

- Conservation of energy, momentum, angular momentum became the most important laws of Nature

- Chance discovery of electricity and magnetism led to the idea of electric and magnetic fields and later to the idea of electro-magnetic fields.

- Since in the 18th and 19th Centuries, less basically interested in understanding planetary motions, heat, light, electricity, magnetism, constitution of matter and 'of course' life and death of animate matter.

- 
- According to Newton:

Absolute Space is an empty container into which objects are put.

Space is isotropic and the same everywhere, and always the same - not a function of time.

This space is devoid of all matter.

# Reality, Oneness and Consciousness

(1)

- Let us straight away go into the definition of the parameters — Space, Time, Matter, Energy, Radiation, Field, Force etc. ~~It~~ before the advent of the 20th Century, and essentially based upon common sense ideas, which defined and rendered themselves suitable for measurement and mathematical formulation.

- Space : • According to Newton Space is an empty (devoid of all matter) container in which objects are put. Space is absolute, no motion. Same everywhere and does not change with time. Isotropic. (2)
- Time : Space is 3-dimensional.

- Time : Concept comes from succession of events. is continuous and moves in the forward (future) direction — unidirectional. Rate of flow of time is constant and same everywhere and at all time. Though the concept comes from succession of events, time exists independent of events.

Without the concepts of Space and Time we cannot come to any understanding of nature and laws.

Space and time together make a rigid frame work — the stage on which the world of objects displays its events.

Matter

Solid, Liquid, gas

92 elements - (Hydrogen & Carbon.) -

all matter on earth is made of combination of these elements.

All normal matter in the universe is also of the same matter composition (Stardustlike molecule)

All elements are made of three fundamental particles - protons, neutrons and electrons. (atoms  $\approx 10^{-8}$  cm, Protons, Neutrons  $\approx 10^{-12}$  cm) - Lot of empty space in the atoms.

Protons and Neutrons are made of quarks and gluons.

All matter  $\equiv$  quarks, gluons and gluons

20th century results

Radiation

optical radiation - corpuscular, waves.

Heat Radiation -

Electro-Magnetic Radiation - Maxwell, Hertz.

Fields

Gravitational Field, Electric Field, Magnetic field

Electro-Magnetic field -

Fiasco - Ether as content of the fields.

## Transformation of Fundamental Concepts brought about by

- Major experimental and theoretical discoveries in the second half of 19th. and the whole of 20th. Century that transformed the fundamental concepts of Science:

### Experimental Discoveries

- Production of EM waves by Hertz - (1885)
  - Michelson-Morley Expt - Constancy of the velocity of light.
  - Discovery of Radioactivity (1896), X-rays (1897), Electron (1898)
  - Discovery of the Nucleus
  - Discovery of Cosmic Rays
  - Discovery of the Spin of the electron (Hyperfine Structure)
  - Discovery of the Positron - first anti-particle.
  - Discovery of  $\mu$ -meson
  - Discovery of the  $\pi$ -meson
  - Discovery of the  $K$ -meson, hyperons
- } Short lived particles
- Discovery of pair production ( $e^+$ ,  $e^-$ ) and annihilation of  $\gamma$ -rays
  - Discovery of Meson, Nucleon - Anti-Nucleon Production
  - Production of Anti-Matter at Accelerators
  - Discovery of ~~quarks~~ large number of elementary particles at accelerators including Quarks.

### Discoveries in Astronomy in the 20th. Century

- ~~Extra~~ Extragalactic Clusters of Stars and galaxies
- Expansion of the Universe.
- Discovery of Radio Astronomy.
- " Quasars, Pulsars,
- " 30 Micron Radiation
- " X-ray,  $\gamma$ -ray, LHB sources.
- " Ex Accelerating horizons.

# Theoretical Formulation in the 20th Century:

1 Theory of Special Relativity

2 The Quantum Theory

3 The General Theory of Relativity

4 Bohr's Quantum Theory

5 Schrödinger, Heisenberg, Quantum Mechanics

6 Dirac's quantum electrodynamics

7 E. Fermi, Gravitation, EM, Weak, Strong

8 The Standard Model of Particle Physics

9 String theory

Reduction → Holism - One part - Unification of (what happened at special relativity)

{ Matter particles, forces - etc do it vacuum fluctuations  
+ Empty space  
+ passage of time  
↓  
Local & the vacuum  
the loss of contact

Nonlocality and Contextuality -  
↓  
Quantum entanglement  
↓  
EPR paradox  
↓  
Bell's theorem  
↓  
Experimental tests  
↓  
Quantum information theory

How do you quantify the  $\mathbb{P}$  - Self  
↓  
How do you quantify the  $\mathbb{P}$  (low)  
↓  
How do you quantify the  $\mathbb{P}$  (low)  
↓  
How do you quantify the  $\mathbb{P}$  (low)

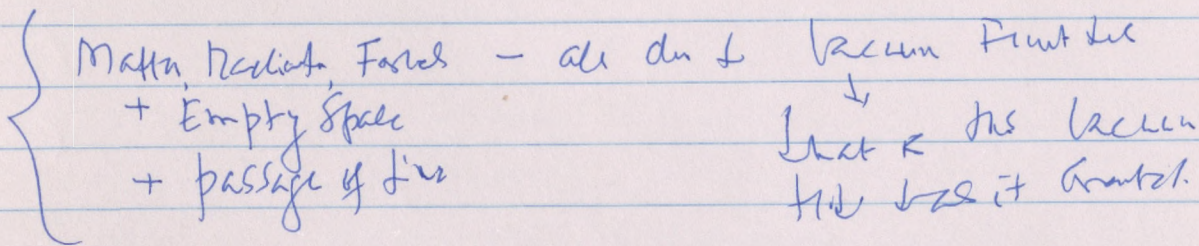
20th Century Development:

- ① Ruckshy, & M., Niels Bohr, QED, General Relativity
- ② Fundamental Physics - Cosmic Rays, Decubus
- ③ Big Bang Theory of Cosmology
- ④ Molecular Biology - Neurobiology

Outstanding Fundamental Problems

- Creation of Universe
- Origin of Life
- Origin of Consciousness

Reduction → Holism - One man - Unification of Matter, Energy and Space



Neurobiology and Consciousness -

Electrical Pulses  
Channels  
in (Brain)

Perception  
Feelings  
Sensations  
Thoughts

} basis of  
consciousness

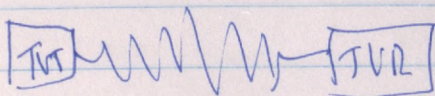
I (?)

How do you generate this I - Self

high -

the center is by high (low)

I down the stream.



Christopher Koch ( )  
Anay elamc ( )  
Mober Caste

David Chalmers (Austria) <sup>IN</sup>  
Dana Zohar, Marshall (New ideas in psychology) ;  
Stapp

Herbert Frolich.

{ Leon N. Cooper - Dintu. Brain Unity. (DEADALVE)  
{ Marc F. Bear - prof. Neuroscience. " ( " )  
{ Seale  
{ Chakrabarti. (Pravez)

2000

# Nation Brain Research Center. (DBRC)

Diratu - Pnt Submiz Fales

Nandini Chakraborty Singh

Narayanan Dey

Sir Kama Seng

Soumya Dey

Laigang & Anjali Purty

Ratna K. Turner

Memory faults

New Song - Nam Anby

L

# Wonder of Consciousness - Harold Langsam

MIT Press Cambridge Mass (2011)

University of Virginia

Engelstein - Positivist turned not

We should take time to appreciate and celebrate the wonder of consciousness

- \* It is difficult to articulate what the wonder of C is  
Facts about the world cannot be known a priori, but consciousness is special; there are important facts about C that can be known a priori
- \* He uses the word 'intelligible' to describe the facts that can be known a priori  
Consciousness is intelligible - there are substantive facts about C that can be known a priori - not all facts  
Some facts about C can be known by introspection; some things (scientific investigations) scientific methods  
We can discern things about C through reflective thinking.  
Mere reflection on intrinsic nature of C can inform us about the causal powers of C  
We do not find intelligibility in non-mental aspects of our concrete lives  
Though emotional reactions
- When we are beings that possess a faculty of reason and this faculty is a major element in our lives -  
It enables us to detect and understand intelligible relations between propositions
- We are surprised that these elements of the concrete world have no sense  
We are also beings capable of knowledge  
We develop a system of values in the world  
Consciousness is valuing for such purposes etc

philosophy is a discipline that secures knowledge through the employment of reason. It is an a priori discipline.

(7) Unlike science, which secures knowledge through empirical investigation, philosophy secures the employment of reason through a priori logical analysis.

His Content: Philosophy secures answers to questions that do not seem to require further empirical investigation. They merely require further intellectual investigation.

Other a priori disciplines like logic and mathematics are concerned with intelligible relations that hold between entities in the concrete spatio-temporal world in which we live.

His stand on philosophy is contentual:

Rationalist: Reason can discern things about the world.

His Content is: As a result of introspection we obtain knowledge of some of the intelligible properties of consciousness and then by reflecting on these properties we obtain a priori knowledge of the intelligible relations that hold among these properties.

philosophers are concerned with obtaining a priori knowledge and not merely explicating the concepts necessarily explicating on concepts.

Reason can detect intelligible relations that hold between the properties.

This feature of philosophy i.e. obtaining a priori knowledge of the world is the latest area of metaphysics.

epistemologists seek intelligible relations between the property of being justified and the non-epistemic properties of beliefs that make it justified

*has been*

philosophers of art seek intelligible relations between aesthetic properties and non-aesthetic properties  
philosophers seem to be interested in practice and not theory.  
philosophers seem to be finding employing reason to find intelligibility in the world

philosophers of mind should focus on finding intelligibility in the <sup>medium</sup> ~~area~~ of mind and focus on ~~and~~ articulate.

*has*  
*constant*  
*philosophy*

But they have not even been looking for it. They have focused on other topics.

they are focusing on the relation between mind and body  
- this has led to physicalism - Everything in the world including the mind is physical. But the answer is not in form of physicalism (1.4.)

Reductive physicalism holds that all mental properties are reductive physical properties

Non-reductionists hold that the essential nature of ~~others~~ some mental properties cannot be described by

*class by*  
*new*

xx non-mental terminology - they are sui generis - like their appearance in the world something new thing completely new appears in the world. - this kind of basic properties. These sui generis properties are not physical properties at all. - no microscopic entities that can be traced to make them.

∴ most philosophers hold that mental properties are not physical at all - Dualists

(A) On January 7<sup>th</sup>, 1966, Dr. Hemis Bhalla, Director of TIFR was invited by the International Centre of Scientific Workers to deliver a lecture during his meeting in Bombay. The title of Bhalla's lecture was "Since India the Problem of Development". As part of Among other things Bhalla stated:

"The Top Search started here in 1945 . . . . ."

(B)

on a Wednesday in 1962, when the physics Faculty meeting was about to begin, I (M.G.K.) was in contact with Mr. Raskolnikov, Secretary to Dr. Bhalla

(C) A Norm adjutant to Dr. Bhalla's office, Mr. N.R. Raskolnikov his Secretary looked on and said "Dr. Bhalla had come to see me (M.G.K.) immediately. When I went to Dr. Bhalla's Norm, he asked me some questions. With Dr. & Leo Szilard and told me "you are adding to the faculty of TIFR a brilliant individual. Dr. Abdul Sattar has been here since before you."

The guiding thesis of this book, that intelligibility is to be found in the mind precludes the truth of non-reductionism. — there is no intelligibility among non-mental phenomena. We cannot learn anything about them the non-mental aspects of the physical world by reflecting on them

xx } We can discover intelligibility in consciousness only because consciousness has an intrinsic nature that is fundamentally different from anything reductionally physical, an intrinsic nature that can ground intelligible relations — thus making possible the intelligibility of the mind

Does not prove

This book — ignores physicalism — how ↓

~~His arguments are based~~

His knowledge of non-reductionism is not based on arguments.

It is based on introspection. — direct contact with the world

When one has contact with portions of the world external to one's mind, we talk of perception. When one has contact with one's ~~own~~ own mind, we speak of introspection

I take myself to have learned large introspection that the mind has properties that are not reductional properties — it has properties that are not structured or causal properties — I have empirical introspective evidence that non-reductionism is true

\* Introspection informs of the existence of non-reductional properties of consciousness. By employing our reason to reflect on these properties we discover intelligible relations that hold among these properties.

Mind is different from body — it is nonreductive whereas body is reductive.

## Conscious States and Mental States -

There are a wide variety of different kinds of conscious states. We can presumably have different kinds of intelligible features - perceptual experiences, bodily sensations, feelings, judgments, decisions, acts of imagining, and acts of willing. There are also mental states such as emotions, moods, thoughts, beliefs, desires and intentions that seem to occur both in conscious and unconscious states forms. I have not discussed this.

I have focused on mental states but as perceptual experiences, beliefs, bodily sensations, feelings, desires, I have been especially dealing with intelligible (perceptual) experiences.

We all know that C is intelligible. But we do not know how to articulate it.

In experience the world reveals itself.

It is not just a brutal connection between experience and the world. Often, the world can be able to reflect on it.

The relation between the two must be describable by reason.  
∴ it has to be an intelligible relation.

Experience of the world is different from the world that is experienced. Then how can they be related intelligibly? (See Chap 2.1)

An intelligible relation obtains between experience and our knowledge of the world. (2.3.1)

## Experience and the World:

Experience is the event of ~~substantiating~~ a subject instantiating a certain kind of mental property. Then the subject can introspect on this property - phenomenal property.

Intrinsic Nature of experience

Intelligible features of perceptual experience -  
made known through introspection

phenomenal properties -

Nagel's "What it is like" terminology is a property of  
experiences and not experience

What does introspection tell us about Phenomenal properties?

For the author Phenomenal properties = What it is like properties  
Physicists will say that introspection tells us nothing  
about phenomenal properties

What is the point of knowing the nature of phenomenal property  
if we cannot articulate about it?

Nature of structural and causal properties can be described, but  
not phenomena

\* It is perception that informs us of the nature of the observable  
properties such as sensory colors and it is introspection that  
informs of the nature of phenomenal properties

Reflection on the nature of colors informs of the similarity  
relations that hold among colors and the reflection on  
the phenomenal nature of colors informs us of the structure  
of relations that hold among the phenomenal colors

Phenomenal properties are distinct from sensory properties.

of Sensory colors is experience when we open our eyes  
but phenomenal relations are in introspection

\* The relation between phenomenal property and observable  
property is similar to relate between whole and part

p. 61 observable properties are intelligibly similar to  
phenomenal properties

It is the nature of consciousness to attach itself to observable properties  
and provide for them corresponding phenomenal properties

phenomenal properties are that it is like properties but  
observable properties are not so

What it is like properties are instantiated for subjects  
observable properties are instantiated in objects

Phenomenal and observable properties are instantiated in different ways

observable properties determine phenomenal properties and

not the other way. (this is the asymmetry) This is done by C

∴ Consciousness brings something new out into the world

How C reveals to us the external world?

Phenomenal externality is discussed and needs to  
observation

## \* The Causal Powers of Consciousness

You have to make a distinction between brute causation and  
intelligible causation

Causal powers are connected to their categorical properties by something  
extrinsic: laws of nature. These laws of nature ensure that  
such and such categorical properties have also such and such  
causal powers

\* Laws of nature are brute and not intelligible. They cannot be  
known a priori

Merely reflection on categorical properties has not informed us of  
their causal powers. Similarly reflection on causal powers  
has not informed us of the nature of categorical properties  
that ground it

Rather to discover laws of nature we need empirical knowledge about their categorical properties are constantly cojoined with their causal powers

The reigning philosophical consensus is that all causation is brute causation. He respectfully disagrees  
I agree that all (reductive) physical causation is brute causation  
Ned Block is the discipline that disallows physical causation being an empirical discipline

- But I suggest that some mental causation is not brute, but intelligible  
Some causal powers of conscious states are intelligible - they can be known a priori. Mere reflection <sup>on mental properties</sup> can inform of their causal powers.

Consciousness relates us to the external world by combining with it and giving phenomenal properties

phenomenal properties are observable properties initiated in a specific way

human track

→ C not only reveals the concrete external world, but also the world of abstract objects to us

Causal powers produce beliefs - introspective beliefs - these are different from perceived beliefs

C is required for rationality.

\* We are not only conscious beings but also rational beings  
These are not unrelated. You require consciousness to be rational.  
How does this connection implement?

Also consciousness is related to our possession of knowledge  
attitude

\* C and belief, truth, rationality, value, justification, appropriateness



Perceptual beliefs are caused by experiences, beliefs about necessary  
relations can intelligibly caused by rational intuitions, intransitive  
beliefs

globally

For beliefs to be rational he needed mental states  
that could function & function both as intelligible causes of  
these beliefs and at the same time connected to the  
relevant parts of the external world. These mental states  
were perceptual experiences

He needed mental states that could constitute perception of values  
These mental states are 'feelings'

Values positive values to be celebrated, negative values mastered  
through our emotional responses to them

When C comes into the world, something radically new  
comes into the world. It intelligibly necessitates the  
world and enables the world to reveal itself to us

In perceptual experience we are conscious of values proper to  
the object instantiated in the world - that being observable  
properties, which combine with acts of C and give rise  
to phenomenal properties

It is the phenomenal properties that reveal the abstract proper  
C reveals external world, logical relations between abstract objects  
Rational intuition reveals portions of the abstract world  
and presents beliefs about them

It enables us to engage actively with the world by consciously taking  
attitudes on propositions that represent the world.  
This leads to the appearance of ~~activity~~ attitude of security  
+ Last paragraph of the book

... objects being in the world of  
appearance, like virtual and false things we could have  
no knowledge of. The intelligible world, in contrast  
was real and could be the object of our knowledge.  
Compare this with the statement of Heraclitus 2500 years later:  
Wheeler

"Strictly speaking there is nothing in the world there has  
never been anything and there will be anything - except  
absolute vacuum. He contends that the physics of the world  
is fully determined by the geometrical shape of space.  
Geometry is the building material of nature."

Faust

"So thy nothing may I see all"

Buddhism

In Mahayana Buddhism it is possible to attain a mental  
state of "nothingness". When the mind can go  
beyond the appearance of even the state of  
"emptiness" where the world appears to be undivided  
and independent "emptiness" - a "Nishata" a state where  
nothing has created.

As a result in 1st century AD, expanded the fundamental  
concept of Buddhism "emptiness" - dependent co-arising  
of things, from a state of nothingness. Reality  
cannot be grasped like the old dog's world  
and ideas, and defined reality as "Sungata", "Void"

## REALITY:

Plato in his Republic (521-531 BC):

The true realities were not part of the visible world. They belonged to "the world of pure numbers and perfect geometrical figures" and these were not seen by the eyes, but by reason and thought. Objects belong to the world of appearance, were unreal and were things we could have no knowledge of. The intelligible world, in contrast was real and could be the object of our knowledge."

Compare this with the statement of Wheeler 2500 years later:

Wheeler

"Strictly speaking there is nothing in the world, there has never been anything and never will be anything except absolute vacuum. He contends that the physics of the world is fully determined by the geometrical shape of space. Geometry is the building material of nature."

Faust

"In thy Nothing may I see all"

Buddhism:

In Mahayana Buddhism it is possible to attain a mental state of "awakening" where ~~the world~~ one can go beyond the opposites and attain the state of "Akinaya" where the world appears to be undivided and undifferentiated "Suchness" - or "Thatata", a state like Buddha had reached.

Asvaghosha in 1st Century AD, expounded the fundamental concept of Buddhism "Suchness". Nagarjuna who followed Asvaghosha further elaborated the concept clearly stating that "Reality" cannot be grasped with the aid of concepts and ideas, and defined reality as "Sungata", "Void"

... without which it is humanly impossible to understand & Lord of it (Michael Michael Shatzman - Galileo - Decisive Innovator Cambridge University Press 1994 p160)

Berkeley: No such thing as matter at all and the world consists of nothing but minds and their ideas

John Dussell's book

Real Table is an 'idea' in the mind of God. Such an idea has the required permanence and independence of ourselves whilst being something quite "unlike" as matter would be otherwise.

Leibniz: (1646-1716) What appears as matter is really nothing but a collection of more or less rudimentary ideas (colony of souls)

- The Real Table is NOT what it seems. It is an idea in the mind of God (Berkeley)
- Leibniz says it is a community of souls.
- Modern Science - Collection of "clatter" changes in violent motion.

Matter

What is the real nature of the table which persists independently of my perceiving it?

Idealism: The doctrine that whatever exists or at any rate appears can be known to exist must be in some sense mental.



[ From Evandro Agazzi Reality of Unobservable ] (reprint)

Contemporary physics is essentially physics of unobservable entities. We have to look for the Reality of these entities.

Scientific observation is different from sense perception - the 'trace' of an electron in a cloud chamber.

Can Reality can be obtained through an instrumental knowledge?

2. Determining Can it be obtained by the use of intellect as claimed by Einstein in his later years

Agazzi

" We cannot know without using our intellectual a priori forms of knowing.

The objects of knowledge are therefore constructed by our intellect but they are "not produced" by it.

Indeed, Kant distinguished thinking from knowing.

Thinking amounts to a pure combination of concepts while knowing requires that these concepts be applied to be actually present sensible intuitions

This is Kant's "empirical realism" and "transcendental idealism".

§  
However, 'Positivism' that followed declared science to be the unique form of adequate knowledge. Compared to philosophy. ~~that~~ This so called Realistic view of science entered into a phase of crisis in the later half of the 19th. Century. The practice of providing scientific explanation of phenomena changed with mechanistic physics became an ~~the~~ important tool in the hands of scientists with the advent of thermodynamics and electromagnetism. But so called "mechanical models" based on the classical formulations could not be successfully

accomplished because of lack of explanation for the Second Law  
of Thermodynamics and the propagating medium 'ether' of  
em laws

- (i) What is Epistemology - How do we know what we know?
- (ii) What is ontology - What is it that exists -  
How is the substance behind anything in the universe

To know something is necessary - Experience is possible  
only when there is consciousness

That leads to the 'knower' the 'I' to know - the experience  
to know what? Everything is in the mind - the external  
and the internal of the 'I'

So the vedantic philosophy can then also be understood beautifully  
and elegantly by the harmonious language - the Maha Vakyas

Satchidananda Brahman -  
I am Brahman - Atma Brahman  
That thou art - you are Brahman  
Atman - Atman Brahman - Atma Sat (Brahman) is Brahman  
Pragyan - Brahman - Consciousness is Brahman

In the modernist philosophy - anything is 'matter' -  
Since they considered this as the only 2nd Law -  
Deduction of matter by P - how we see light also in 'form' -

At the fundamental level, there are two topics that are common to philosophy and science

- (i) One is Epistemology - How do we know what we know?
- (ii) The other is ontology - what is it that exists - there is the substrate behind everything in the universe

To know Experience is necessary - Experience is possible only when there is consciousness;

That has to be the 'knower' the 'I' to know - the experience to know what? Everything in the universe - the external and the internal of the I.

As the Vedanta philosophy all these are connected beautifully and elegantly by the Upanishadic language - the Maha Vakyas

{ Sarvam Iham Iham Brahmanam -  
I am Brahman - Atman Brahmani  
That thou art - you are Brahman  
Aham Iham Brahmanam - The Soul (I) is Brahman  
Pragyanam Brahmanam - Consciousness is Brahman

As the materialist philosophy - everything is 'matter' -  
since they considered this in the very early days -  
Dichotomy of matter & spirit - don't tell anything else but 'five matter'

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