

## SCIENCE IN THE PATH OF SYNCRETISM\*\*

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Joseph Needham, the famous historian of science, has recommended syncretism of the positive elements with healthy secular knowledge systems in human civilization such as Science, Spirituality and Socialism or *Sâmya* etc. The apparent conflict between Science and Religion has arisen since the latter has been mis-represented by dogmatic theology. This paper deals with the conflict between medieval science and theology, the true domains of science and religion, the movement of Syncretism within the conventional domain of Science, and finally the exciting new field of Syncretism in the multi-disciplinary Consciousness Studies.

**Key words:** Conflict, Consciousness, Matter, Non-Matter, Objectivity, Religion, Science, Secularism, Socialism, Spirituality, Subjectivity, Syncretism, Theology.

Religion has two distinct components: the rose of spirituality and the thorn of theology. Dogmatic Theology is definitely 'evil' (if one adopts the definition provided by Aldous Huxley), since it is exclusive and separatist in character and thwarts the growth of not only genuine spirituality but also of the open-minded, healthy secular knowledge systems such as science, music, sculpture, and painting, freedom of expression, new innovations and social doctrines. The secular knowledge-systems are often ethically neutral, non-spiritual, but not necessarily anti-spiritual or 'evil' (like dogmatic theology). Much of the secular traditions are 'good' and even necessary for the sustenance and healthy growth of human civilization, spirituality and syncretism.

Crucial for the evolution and growth of syncretism, we endorse not only the most important concept of 'Spirituality' but also at least two other broad thought-systems : science including technology and (spiritual) socialism or *sâmya*.

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These three constitute the three legs of the 'Tripod' of Joseph Needham, a system which becomes unstable in the absence of any one leg when the support on the other two legs may become infructuous. For stability, at least three legs are necessary, and more the number the better, as in a Multipod. Another allegorical representation of the ideal system of syncretism would be a circle or a sphere with the human civilization and destiny in the centre, and so many mutually inter-connected and inter-acting knowledge-systems on the periphery<sup>1</sup>; or still better, we have the healthy human body with so many organs and limbs working in syncretic unision!

Science in the ancient world grew out of necessity and curiosity. Whereas the 'heart' and emotional awe of the mankind led to spirituality, the 'brain', the curiosity and intellect led to the rudiments of science and technology. Over the time-span of a few millennia years were evolved the pointed and abrasive stone, fuel, fire, wheel, furnace, brick, pottery, metal-making technology etc. Gradually appeared the knowledges and intelligent uses of seeds, agriculture, numbers, arithmetic, geometry, language, grammar, scripts, astronomy, medicine, rudimentary knowledge of physics, chemistry, materials, minerals and gems, metals and alloys. It is well-established that during the Gupta era, before the fifth century after Jesus Christ, India was not only famous in the tradition of spirituality, but also leading the rest of the world in several fields of specialization related to science and technology<sup>2,3</sup>.

#### CONFLICT BETWEEN MEDIEVAL SCIENCE AND THEOLOGY

Since the R̥gvedic era, the human intellect in India was endowed with indefatigable curiosity and criticality of thoughts which were logical and scientific even by the modern standards.<sup>4</sup> It thrived on the basic proposition of the principle of causality, the cause-effect syndrome, rather than indeterminacy of events and fatalism. Rudiments of scientific and secular knowledges were syncretised with spirituality, mystic experiences and mental/ethical practices (yoga ) in the teachings of Gautama Buddha.

However, most of the sciences had come under the stranglehold of theology which usurped the autonomy of science itself. Quite sarcastically, Sarton wrote:

"The theological constructions seemed unshakable; they were not based upon observation, hence no amount of observation could destroy them; they were not based upon deduction, hence no amount of logic could impung them. They stood apart and above the world of experience"<sup>5</sup>

Quite naturally the scientific spirit came into conflict with the orthodox, obscurant, dogmatic theology. Gautama Buddha questioned the divine origin of the caste system and the Vedic rituals. There were incessant *Manuvâdî* diatribes against the anti-caste *Hetuvâdî* or logical non-conformists believing in scientific causality, in genuine observation and inference.

Eventually, the infallibility of the Vedas, the Bible and the Quran were questioned, and sensible people asserted that these sacred texts were human constructs, and therefore amalgam of truth and conjecture.

Āryabhaṭa worked out the precise physical and mathematical theory of solar and lunar eclipses, but the conservatives frowned upon the attack on the traditional 'Rāhu theory'. Ibn Sina proposed immutable laws of Nature which are not violable. The hostile Ulema shouted back that the said proposition was tantamount to a curtailment of Allāh's freedom to tamper His own Law. Galileo repudiated the Biblical theory of geo-centrism and consequently faced the terrible Inquisition. Later, a similar hue and cry arose when Charles Darwin criticised the Biblical theory of creation of the universe and the earth in a short time. Proofs were provided for the prolonged 'Natural Selection and Evolution', but these did not please the diehard Churchmen.

Modern Science was born in the 16<sup>th</sup>/17<sup>th</sup> century Europe. It could prosper because the defiance against Theology was adequate at that point of time and in that continent, not in Asia. The intellectual atmosphere in Europe also resulted in the births of Protestantism, anti-Papacy and anti-Monarchy traditions, social revolution and liberalism.

All the old conservative and obscurant ideas which had grown for centuries under the umbrella of theology could not be destroyed overnight. Alchemical ideas were challenged by Paracelsus and Boyle. Boyle argued that if water and air were really 'elements', then these would have come out of a heated and molten sample of gold. The idea of transmutation of a base metal to a noble metal such as gold was a mirage. Astrology and Gemmology were ridiculed by Kauṭilya and Plotinus but these subjects continue to flourish in the 21<sup>st</sup> century. The notion of 'Creationism' by the Creator, the Absolute, is not dead yet, even though Richard Dawkins the author of *The God Delusion* (Black Swan, Trans World Publications, London) has been mercilessly attacking Creationism. A recent survey has shown that 30-40 percent of the Indian scientists 'still believe in God, in prayer', and therefore arises the bemoaning 'God save Indian science', as if modern science means faith in non-faith atheism !

The earliest advocates of modern science were not atheists. Francis Bacon merely talked about the newly born science growing as an adult in future and controlling and even dominating over the vagaries of nature (not God). Otherwise, the new movement was cautious and defensive on the whole. During the 1660's, the Royal Society defined Natural 'Science' (formerly known as Natural 'Philosophy') in a restricted sense, and delinked it from any discussion of religion (god, spirituality, theology) and politics (social sciences). It was an arbitrary decision, very ingenious, designed towards the strategic survival of the profession and apprehensive scientists themselves.

The deliberate decision of the Royal Society was unfortunate for two reasons. Firstly, in its urge for narrow specialization, science achieved remarkable depth and success, but lost the serene breadth of humanism which needs to be re-captured after 350 years as suggested by Fritjof Capra. Secondly, the truth-content of spirituality and mysticism was ignored and the pernicious theology was treated as the sole spokesman of religion. Thus, religion as a whole was declared as 'unscientific' and not reconcilable with the spirit of modern science.

Flush with success, modern science is no longer a baby in the hand of the tyrant religion, and so the role has been reversed. The tirades and mutual accusations continue. Religion has prejudices, as if science does not have any. Religion had triggered so many wars of crusades and jihads, but science has done better in two shots over Hiroshima and Nagasaki! If Religion is opium, then as Needham has suggested, science is hashish. Evidently, this is all nit-picking and mud-slinging. One can always vilify one's adversary by highlighting his shortcomings instead of the virtues. The deficiencies in the conventional science, religion and socialism, as practised to-day, have deep and common roots in the human psyche itself. The plain fact is that in the world of Truth, experiential spirituality and experimental science should become friends and not adversaries !

### THE DOMAIN OF SCIENCE AND RELIGION

For the remainder of our dissertation we may occasionally use the term 'religion' to indicate its positive aspect only, namely spirituality and mystical experiences, and not the theological doctrines of denominational religions. Dr. Palash Baran Pal has written an illuminating article in Bengali : "*Vijñāner Paridhī*" – the boundary of 'science' (*Desh Patrika*, 17 March 2008, pp. 51-56) – which rekindled my earlier thoughts received from my mentor Aldous Huxley and

articulated in an early book of mine<sup>2</sup> “*Science in India*” and its seventh chapter ‘Religion and Science in the Indian context’ (pp.99-118).

Pal started with a very tentative definition of the modern science as the ‘growing accumulation of facts, analyses and conclusions regarding the material universe or nature, both inanimate and animate’, and quickly proceeded to show how hazardous is that definition. There is severe limitation even in the effort to precisely show the boundary or the limit of science. Does science concern itself with the entire body of truth or only a part of it ? In the latter case, what is the sharp dividing line ?

If we put an emphasis that ‘science’ is concerned with the material universe alone, then a legitimate question may be raised: what about non-matter entities such as force-and energy- patterns, time, space, concepts like number, point, line, plane, mind, thought, consciousness, soul etc ? Are these immaterial? What about intelligence, emotions, love, social cohesion, politics, ethics, mystical experience etc.? Do not these affect the ‘material’ universe?

The word ‘science’ itself was not very much in vogue before the 17<sup>th</sup> century, but its phenomenal success has bestowed upon it the halo of ‘truth’, so much so, that non-scientists have coined the terms Science of Economics (Nobel Prizes are awarded), Social science, Political science etc. Then what is wrong in coining the term ‘Spiritual science’ to honour the great experientialists like Gautama Buddha and Jesus Christ? Were they like some crooked alchemists making false claims? We are not going to evade the issue of subjective truth.

Science assumes legitimate pride in quantification, in measurement, in mathematics which are considered to be the gates, the points of entry for the Hall of Fame, namely formulation of mathematical laws for other sciences, and also in objectivity, ‘proof’, reproducibility, falsifiability, and so on. But these yardsticks are not uniformly useful in all sciences. The social events are not as predictable or reproducible as the phenomena which can be investigated in test-tubes, instruments or machines. But that is readily explained in terms of intervention of the much more complex factors of life and consciousness, which are not predominant in the inanimate world. Quantum mechanics has revealed indeterminacy and observer-observed interactions in the domain of nano-world and sub-atomic particles.

Alexis Carrel, a Nobel Laureate, has categorized in his book *Man the Unknown*, the various sciences or knowledge-systems, from mathematics down to psychology, in the decreasing hierarchy or order in terms of reproducibility, verifiability, predictability and increasing order of subjectivity. Psychology is much more complex, since it involves 'life' and 'mind', whereas mathematics is entirely based on definition. Bertrand Russell admired the grand cosmos and the beauty of mathematics but considered the tiny speck of life as an 'aberration' in the cosmos ! We think otherwise.

It is indicated (in Reference No. 1, pp. 6-7) that there is a parallel hierarchy regarding verifiability, reproducibility, predictability, objectivity in the series: mathematics, physics, chemistry, biology, psychology, and mystic experiences. With more and more intervention of consciousness, the knowledge-system becomes less and less predictable and objective. Should it, for that reason, banish psychology, mystic experiences from the domain of science ?

Aldous Huxley, one of the mentors, wrote to me from his Los Angeles residence on the 19<sup>th</sup> February 1961 : "No subjective experience can be demonstrated. How do you demonstrate music? Religious truth is a state of mind which is achievable".

Although religious truths cannot be proven objectively, it is unfair to say that subjective proof of love, mystic experience etc is no proof (Reference no.2, pp.113-115). Even the proofs in the domain of science are ultimately subjective in so far as these are evident only to the trained minds. The existence of an electron for instance is not evident to an illiterate, untrained person. He may be shown the experiment, he may 'see' it, and yet not understand its significance, experience the truth. In the domain of truth, experiment and intelligent experience should proceed hand in hand. The experience is indeed subjective. Automatically, the issue of falsifiability so relevant for an objective truth, is taken care of.

The pursuit of religious truth is no doubt based on the faith that some super-natural forces exist. But then the scientific pursuit is also based on some faith regarding the existence of inviolable laws of nature. In both kinds of search, the seeker trusts in the principle of causality and the impeccable character of the mentor.

In his scintillating lecture 'Reason and Religion' delivered in England, Swami Vivekananda categorically stressed that religion has to justify itself through reason, the spirit of science.<sup>6</sup>

We hope that most of the readers may accept that modern science and religion deal with two essential varieties of truth, two different sectors of a larger universe of Truth, the first dealing with the objective variety amenable to experimental verification and falsification, and the second the experiential subjective Truth. Science and religion do not have the exclusive monopoly over either objectivity or subjectivity. In this 21<sup>st</sup> century and onwards, they have an excellent opportunity of working together to evolve a larger truth-body and that amounts to a giant step of syncretism. In four millennia, religion has tried imperfectly and consequently failed to evolve a syncretic world, and with its brilliant record of merely four centuries, Science can certainly aspire to aid this process.

#### SCIENCE AIDING SYNCRETISM

The present author has two other mentors whom he never met : Swami Vivekananda and Joseph Needham. Needham's contributions lay in his multi-volume magnum opus, *Science and Civilization in China (SCC)*, his espousal of the 'Tripod of Syncretism' and in his sagacious advice to the newly constituted United Nations to name one of its branches not UNECO but UNESCO, to add the word 'science' between education and culture. Needham was convinced that in this new age, science can and must link education with culture.

Thanks to the master-minds like Francis Bacon, Galileo, Kepler, Boyle, Newton, Lavoisier, Maxwell, J.C Bose, Einstein, S. N Bose etc., science has already initiated an internal movement of syncretism within itself which can be extended to the external domains of truth such as spirituality and socialism. Before we deliberate on the ongoing science-spirituality nexus as in consciousness research, may we very briefly narrate the internal achievements in science just for record.

Let us propose tentatively, seven broad categories (there may indeed be some more) of the internal and syncretic achievements in the movement of science, which are pregnant with further possibilities:

- A. Matters related to 'matter' that is material science.
- B. Force-energy –matter nexus ; particle –wave duality.
- C. Life process systems – the biological world.
- D. Evolution- ecology systems

- E. Creativity : new forms of matter, new life-systems, force-energy systems, machines, technology etc.
- F. Methodology.
- G. Applicability

Some detailed comments may now be presented.

**A&B.** Our concept of ‘matter’ has evolved a long distance from the Aristotelian or peripatetic view of the so-called ‘five elements’ and yet many questions persist. Why does the property of particulate matter vary widely as we move down, from the macroscopic to the microscopic ‘size’. Gold is not yellow in the colloidal and nano size spectrum where quantum effects predominate. Why some of the sub-atomic particles like neutron have mass but no charge, and some others like electron have charge but very little mass. Incidentally what is ‘mass’ and what is ‘charge’ and their origin? One postulate is that mass is attributed to the sub-atomic particles by ‘Higgs Boson’ which is ‘expected to be discovered’ in the mammoth Large Hadron Collider experimental facility of the C.E.R.N in Switzerland. (Leo Lederman’s book *The God Particle*).

Albert Einstein asked himself why is electron negatively charged. In other words why did its counterpart positron of same mass and (positive) charge not prevail. Antimatter, the counterpart of ‘matter’ contained positrons. Einstein’s answer to his own question was that ‘there was indeed a fight’ during the ‘Big Bang’ between equal parts of matter and anti-matter (each about half of 95 p.c.) leaving the residue namely 5 p.c. of the total, as ‘matter’ and a huge amount of energy ! Of course this is merely a postulate. A robotic NASA probe has recently estimated that the ‘Big Bang’ took place 13.7 billion years ago whereas for the ‘pulsating universe’ theory, very much like the Hindu postulate of cycles of creation and destruction, astronomer Sandage has estimated a period of pulsation of 80 billion years (vide, Martin Bojowald, *Scientific American India*, October 2008).

There are four kinds of forces in Nature: the weakest but most pervasive in the cosmos, the gravitational force, the electro-magnetic at the macro-and micro-level and lastly the strong and the weak forces at the sub-atomic level. Force is conceptually connected with ‘energy’, but what is the source of huge energy reservoir in the cosmos. Only a small part of it has been utilized in the creation of ‘matter’ in our material universe. Why is there the particle–wave duality at the sub-atomic level ?

Brandon Carter, a reputed astrophysicist observed that the two forces, gravitational and strong interaction, are so incredibly fine-tuned that if the force of gravitation had varied a very little, 1 part in  $10^{40}$ , then this delicate balance would have been destroyed, and stars like our Sun would never have been formed. Stephen Hawking did not believe in Eastern mysticism or Carter's 'Anthropic Principle', and yet conceded that if the electric charge of the electron had been slightly different, stars would not burn to give us light and supernovas would not fling back into space the materials for our solar system. Is our universe possibly 'run by a transcendent intelligence'?

Richard Feynman trying to explain the electrons starting from the source as particles, ending as particles on the target but behaving as waves in between, compared them with school children behaving obediently at home and the school, but playing naughty pranks on the road ! The physicist Freeman Dyson wondered whether 'mind is already inherent in the electron'.

Science must be given credit for its syncretistic role, for its objective discovery of subjectivity even without any assistance from religion. Einstein attempted G.U.T. (Grand Unification Theory), trying to provide one theory explaining the 'four kinds of forces' but having ignored the fifth principle of 'uncertainty', a quantum phenomenon, he failed. Abdus Salam and others have achieved some measure of success. But the T.O.E. ('Theory of Everything') dreamt of by Stephen Hawking remains unachieved. Is it because the sixth principle of 'Life' encompassing Mind and Consciousness has not yet been integrated into the T.O.E. . ?

**C&D.** As in Physics and Chemistry, spectacular advances have been made in the fields of biology and bio-diversity. The field of origin and evolution of life has been characterized by remarkable inter-disciplinarity which is a hall-mark of Syncretism. The subject has concerned itself with genetics, molecular biology, evolution, bio-diversity, bio-chemistry, bio-physics etc as well as geology, fossils, astro-chemistry, radio-astronomy, extra-terrestrial intelligence, meteoritics and so on.

It is unfortunate that having stated the aforesaid glorious achievements of science, Professor MGK Menon, a renowned physicist, was emboldened to make the following statement that all aspects of the creation of living matter can be understood *entirely* (italics mine) in terms of the laws of physics and chemistry as applied to biology, thereby discounting altogether the possibility that the living matter may possess a factor which is non-matter or a vital force (Reference no. 10, p.264).

Menon mentioned Erwin Schrödinger's masterpiece *What is Life ?* (1944) but overlooked his statement earlier cited by the present author (Reference no.2, p.111 ): "My body functions as a pure mechanism according to the laws of nature ; yet I know that I am directing its motions. The only possible inference from the two facts is, I think that I am the person if any who controls the 'motion of the atoms' according to the Law of Nature". The present author had commented in 1969 that this 'I' is supremely important and not wholly within the domain of physics and chemistry. 'I' represents the mind, the consciousness, the doer, and cannot be left out from the scheme of this universe<sup>2</sup>.

Unfortunately, non-biologists like Russell have always ignored the problem of 'Life'. Bertrand Russell stated in his *The Scientific outlook* : "In passing from Physics to biology one is conscious of a transition from the cosmic to the parochial.... From a cosmic point of view Life is a very unimportant phenomenon"! Who was parochial? Not Pierre Teilhard de Chardin, who remarked in his *The Phenomenon of Man*: "The apparent restriction of the phenomenon of consciousness to the higher forms of life has long served Science as an excuse for eliminating it from its models of the Universe". Alexis Carrel, a Nobel Laureate, has ruefully commented in his *Man the Unknown*: "If Galileo, Newton or Lavoisier had applied their intellectual powers to the study of the body and consciousness, our world would be different to-day. The extremely complex science of psychology is in the state of surgery when surgeons were barbers, of chemistry before Lavoisier at the epoch of alchemists".

Of course there is abundance of hope in the newly born genetic science and engineering relating to the existence of DNA as basic to all living systems. Christian de Duve, the eminent Nobel Laureate has written: "All the known living beings that subsist, grow and reproduce on this planet, propagate themselves by the same mechanism, no doubt inherited from a common ancestral form. The revelation is awe-inspiring." Yes, this revelation inspires not only awe but also humility, since at last, the door is opened for life which houses consciousness and mind. The residence is the external 'matter' but the internal resident is probably not !

Evolution and ecology taken together, would lead us to a paradise in which all sciences may co-exist and interact. Some astrophysicists have considered the possibility of the existence before the 'Big Bang'. The archaeologists are taking interest in all the events which have taken place since that great event 13.7

billion years ago, which produced  $10^{11}$  galaxies of which ours is one, with one Sun amongst  $10^{11}$  stars. Our earth became habitable around 3.85 billion years ago as shown by the stromatolites, the remains of large complex bacterial colonies. Investigations of deep sea-bed Manganese nodules and other deposits, fossils on sedimentary rock and the complex molecules such as polycyclic aromatic hydrocarbons appearing in meteorites coming from outside etc. clearly show that 'Life' on the Earth 'advanced' through interactions between molecules, simple and complex with the early forms of life. But then how, when and where was the first speck of life created? Who was the creator: god, nature or thermodynamics? Who created the creator? These unanswerable questions are shelved by the creationists as well as the anti-creationists, the God-believers as well as the thermodynamics experts. Accusing each other spiritedly they do not realise, that they stay together in the same boat of uncertain predicament.

Evolution scientists have scanned the vast expanse of time from the past to the present, and the ecologists have utilized this information and also the present-day knowledge of meteorology, atmospheric physics and all other sciences for an intelligent encounter with the future. More than anybody else, an ecologist admires the metaphor of our earth being a small boat in the vast ocean of this universe, and they keep reminding us all the time: 'Do not rock the boat'. Everybody should know the consequences of destroying the balance, the equilibrium, the harmony. Hence prosper the new sciences of eco-engineering, waste recycling, conservation of precious materials and energy-systems and even 'creating' them.

**E.** Science earnestly believes in creativity and not merely in conserving what has been created. The accusation that scientists are 'playing God' is most unfair. We find strong echoes of creativity in literature, music, fine arts, sculpture, painting etc but in the science-technology nexus we find additionally a fine blending of truth content and application. In pre-science era, the ancient technology had little awareness in the truth content, and hence creativity existed only at a low level.

In the modern age, the scientists have created new forms of matter such as nano particles, artificial gems, new allotropes such as fullerene, polymers, new synthetic organic compounds etc. R.B Woodward, a Nobel Laureate in Organic Chemistry, had the extra-ordinary capacity for visualizing complex three-dimensional molecular structures in his mind and could combine art and science in the synthesis of organic compounds. Even a small difference in angle at which an atom is joined made a difference as to what that substance becomes. Thus, two different reserpines

could be made; this creativity was in the realm of poetry and sculpture. Woodward not only synthesized Chlorophyll and Vitamin B<sub>12</sub> but also ‘juxtaposed some Buddhist mandals’ in the molecules (Reference no. 8 pp. 181-203) .

New forms of Life have been ‘created’ through genetic engineering. Hybrid plants and animals have been ‘created’ and wild life domesticated. Recently Craig Venter has created synthetic cell which is called ‘synthetic’ since the cell is totally derived with a synthetic chromosome—a synthetic version of the DNA from a small bacterium called *mycoplasma mycoides* – transplanted into another germ called *mycoplasma capricolum* which had most of its insides removed. The new bacteria had totally different properties.

We consider that these examples pertain to ‘conversion’ (of one kind of energy, matter, life to another) or second order creation, and not original or first order creation. Who has created the huge amount of energy in this universe, the first lot of sub-atomic particles, atoms and molecules, the first speck of life? Nature? Thermodynamics? Be that as it may, human beings on this earth have journeyed a long distance in the scale of intelligent evolution. From a 500 cm<sup>2</sup> cerebral cortex of hunter-gatherers, we now have a 2200 cm<sup>2</sup> analogue of a current-day human. It is said that this denotes an enormous increase in ‘intelligence’; but what about concomitant changes in wisdom, ethics and morality?

**F.** In our opinion one of the best contributions of Science to the human civilization has been the ‘scientific’ attitude and ‘scientific’ methodology. Even the non-scientists have admired the methodologies of science and its positive achievements, so much so, that they have adopted the term ‘scientific’ to indicate something rational, logical, trustworthy. Of course such an accolade should make Science humble rather than arrogant. We have quoted Swami Vivekananda as saying that religion must follow the wonderful methodologies of science.<sup>6</sup>

The traditions of ‘Science’ include the fabulous varieties of objective observation, ever-excelling apparatus for observation, experiment and accurate measurement, data processing, statistical correlation, mathematical laws, emphasis on the causality principle, complex cause-effect network, paradigm building, its modification, even dismantling if necessary, falsifiability etc.

Statistics is a very important subject and often the initial step in a scientific endeavour; but it cannot be the end of the story, the last word. Precise causal network as in physics must be established and invoked. It is well-known that

smoking induces cancer, but non-smokers are affected as well. So? Our school teacher in mathematics used to say that just writing the final correct answer to a mathematical problem would not help in examination. The steps must be shown; who knows whether the students have not copied the final answer from their neighbours !

The present author has discussed the complexity of causality networks as electrical circuits, currents flowing in series, in parallel and cyclic mode (Reference no. 1, pp.6-10, 445-470). Homeopathy may work, but the question is how, what is the mechanism. A sense of fairness demands that we admit of empiricism existing even in allopathy or modern medicine. Evidently genetic molecules work well in the life systems, but we need to explore how precisely do they work. Perfect 'science' is miles away from statistical correlation and empiricism. Einstein did not disapprove the statistical procedure in quantum mechanics. He only expected Physics to do better, causality to survive, and God not drawing lots and 'playing dice' all the time ! Paradigms must be built and dismantled whenever necessary. The issues of 'proof', verifiability, reproducibility, objectivity and subjectivity, as we have discussed before, are wide open for further deliberations.

**G.** The methodology of 'science' seems to be applicable not only to the old and established disciplines, but also to the new ones, the inter-disciplinary programmes, and even fringe area subjects such as astrology, less conventional medical systems, life in other planets and stars, consciousness etc. The readers should particularly note that the present author has not committed whether the fringe area subjects according to him, are true or false (off the record, he has little faith in astrology !). The argument is that if something is indeed 'false', let its falsehood be proven !

Does not science insist in the touchstone of 'falsifiability' and smartly evade the knotty issue by proclaiming that in the absence of a test for falsification the phenomenon itself is outside its domain ? Is statistics outside the domain of science ? If as in the tossing of a coin, probability of a phenomenon occurring is fifty percent, then can we say that the phenomenon is fifty percent false ? The improbability to the extent of an infinitesimally small percentage is still a stigma in the pure white dress of 'reproducibility', 'proof' etc of an objective truth. Is it not?

The debate raised in the previous paragraph is not frivolous. It is very relevant in the context of life sciences, more so in the social sciences and above

all in spiritual sciences, which are progressively engrossed in greater amount of subjectivity, the perpetual bug bear to the natural scientists who are now saddled with statistics and the spectre of subjectivity in objective truths ! However, nobody needs to be scared. We are not proposing that all new disciplines are necessarily true or proven; we have merely argued that the methodology of natural science is applicable even when we venture in the uncharted ocean of subjectivity. These disciplines should be given a fair trial. Full kudos to natural scientists in the modern era, now that they have agreed to initiate dialogues and even experiments in collaboration with the spiritual scientists in the area of consciousness studies. This venture may lead to syncretism, if not synthesis.

#### SYNCRETISM IN THE CONSCIOUSNESS STUDIES

Since the 1980's, several international conferences have been organized in which famous theologians and scientists (quite a few amongst them Nobel Laureates) deliberated on the possible synthesis of religion and science. Several multi-authored monographs<sup>7-11</sup> have been published featuring these deliberations.

The formal professional dialogue had started immediately after the 1956 publication of Einstein's '*out of my later years*' in which he had written : "Science without religion is lame, religion without science is blind". The leading scientists and theologians of the Massachusetts Institute of Technology and the Harvard University founded the Institute of Religion in an Age of Science (IRAS) which has arranged dialogues, and published the distinguished journal *Zygon*. George Wald, the famous biologist and a Nobel Laureate, considered the possibility that 'Mind, rather than being a very late development in the evolution of living things, has been there always'. Instead of referring to God, he focussed on the universal consciousness or *caitanya*, of which each human mind is a part. Quite fittingly, consciousness research has become the logical meeting ground of science and religion.

We have already argued that (a) subjective experience like religious truth cannot be objectively demonstrated and (b) even the proofs in the domain of Science are ultimately subjective in so far as these are evident only to the trained minds. Krishna Roy started with the dictum of Rene Descartes—*Cogito, ergo sum*—I think, therefore I am – and explained how this *Cogito* principle was used by Descartes to found the sciences, and also to justify the sciences other than the natural science. The followers of Descartes can be classified into two groups :

(a) the positivists, the naturalists who hold that ‘scientific knowledge is essentially impersonal, objective and logical-mathematical’, and (b) the humanistic scientists who would not abandon the ‘essential role of personal, embodied and perceptual consciousness in scientific knowledge’<sup>12</sup>. It has been investigated whether the sciences can really achieve the pure, unconditioned objectivity, and it appears that such an ideal, though glorious, still remains unrealized.

There is a gulf of difference between the subjectivity of wisdom through mystical experience and the subjectivity of dogmatism. The upholders of religion often ended up with the rigid dogma of ‘Creationism’ which postulates that the universe and life were created according to whatever was stipulated in the Vedas, the Bible, the Quran etc. Disputes with Galileo and Darwin led to the birth of modern science. Now the ascendancy of science has led some modern philosophers to propose that the quantum mechanical properties of non-location, indeterminacy, illusion, duality of sub-atomic particle and wave etc are very much the principles enunciated in the Vedanta: “Consciousness research is moving towards the vedanta, as the quantum mechanics and spirituality appear to be converging” (Amit Goswami, reference no. 8 pp.421-437 ; Swami Jitatmananda, Ramkrishna Mission Institute of Culture Bulletin, February 2007, pp.53-64). But many scholars repudiate the hasty notion that ‘modern Physics seems to corroborate the vedantic truth of unity’.

Equally hasty are the material reductionists who are aspiring to solve the problem of ‘consciousness’ through brain research alone. Francis Crick of the double-helix fame has been one of the great proponents of the reductionist approach in explaining human mind in terms of material constituents and forces. He believed that consciousness awareness in higher animals and in humans can be related to the rate at which the brain cells oscillate around 40 hertz or cycles per second<sup>13</sup>. Quite understandably, many scholars refuse to accept his ‘astonishing hypothesis’ that the mystery of human consciousness is ‘no more’ than 40 hertz oscillation !

Crick’s paradigm has been pursued by his junior colleague Christof Koch who seeks to show that for each conscious experience, a unique set of neurons (there are  $10^{11} - 10^{12}$  neurons in the human brain) in particular brain regions fires in a specific manner. His theory has been contested by Susan Greenfield who postulates that the reductionist approach merely seeks Neuronal Correlates of Consciousness (NCC) and does not go beyond. A more plausible view of consciousness is that it is generated not by a qualitatively distinct property of the brain but by a quantitative increase in the holistic functioning of the brain.<sup>14</sup>

Some of the most outstanding scientists have found it impossible to explain consciousness or mental function on the basis of the existing knowledge about the human brain. Gerald Edelman suggested that a human brain with a functioning mind is a holistic system operating beyond the summation of independent units in a parallel processing computer. He noted sharply : “To reduce a theory of human behavior to a theory of molecular interactions is simply silly. To be human is to go beyond physics”.<sup>15</sup>

Edelman postulated that the way brain works has more in common with a vast jungle or ecological habitat than a computational system. There is the ceaseless novelty and creativity of mental processes which constantly evolve, and therefore can never be fully mapped by computational neuroscience. Although we know more about the smaller units of the nervous system, we do not yet understand the integrated function of the brain or what is the ‘seat’ of consciousness. The brain is not exclusively the seat of consciousness. It is a constantly evolving apparatus for the play of consciousness.

David J. Chalmers has distinguished between the ‘easy problems’ such as the molecular and electronic changes related to the perception of ‘blue’ colour and the ‘hard problems’ in consciousness such as the nature of the perception of blueness . Why is it that when our brains process light of a certain wavelength, we have an experience of ‘deep blue’ ?<sup>16</sup> Jonathan Shear has raised the issue of the subjective sense of colour. It can occur completely independently of the presence of light as, for example, in a dream in a darkroom. Are the neural and electronic responses the same as in an objective experience?<sup>17</sup> Neuroscience seems to be inadequate to tackle the ‘hard problems’, tougher than the riddles of physics.

It has been admitted in the ‘Postscript’ of the recorded Tucson discussions on the ‘Science of Consciousness’ that :

“Science and Philosophy face a daunting chasm between reductive materialism and subjective experience.... The brighter we illuminate reality with the light of science, the more we become aware of the surrounding darkness.”<sup>18</sup>

Harman pointedly refers<sup>19</sup> to a fundamental dilemma: modern science is unable to explain ‘how do we know what we claim to know’, to define consciousness itself, to account for several phenomena such as awesome creative insight, apparent memories of other lives, thought-reading, out-of-body and mystical

experiences etc. Therefore, either we must deny our innate wisdom and the accumulated treasure of mystical experiences, because ‘monothetic science claims to explain everything through inviolable scientific laws and therefore the unexplained is absurd’, or we have to face the fundamental inability of science in its present form to explain the entire reality including consciousness itself and the mystical experiences.

Neuro–scientists have not abandoned their optimism regarding the ‘unravelling of the mysteries of the brain and may be the mind’. The human system is indeed very complex. The basic unit of the nervous system is a neuron. There are approximately  $10^{11}$ - $10^{12}$  neurons in the human brain connected with each other through numerous synapses. One neuron may have  $10^3$  to  $10^5$  synapses. The nervous system has several levels of organization : nano upwards to micro- and macro-level.

P.N Tandon<sup>20</sup> refers to newer brain-related imaging techniques: Positron Emission Topography (PET), Nuclear Magnetic Resonance Imaging (MRI) and *in vivo* Spectroscopy (MRS), Single Photon Emission Computerized Tomography (SPECT) etc., which now permit physiological, biochemical, and pharmacological processes to be studied in the brain of conscious, behaviorally active human beings. Swami Prabhānanda has noted that some scientists have conducted SPECT measurements ‘during the peak moments of meditation’, and have ‘proved beyond doubt that mystical experience is biologically, observably and scientifically real’ (Reference no. 11, p.20). Patricia Churchland has discounted in her influential work *Neurophilosophy*, the traditional style of philosophy featuring mind-body dualism and proposed instead the ‘mind-brain continuum’. L.C Johnson has reported EEG and MRI neuro-physiological data identifying ‘individuals whose brains consistently respond to stimulation being experienced by a distant partner’ (Reference no. 10, pp. 310-331, 475-476). The evidences are not conclusive, and yet this line of investigation must not be abandoned.

Consciousness–related research need not, and must not be confined to human brain alone. Now that we have ascended in the scale of evolution, in body and mind, we ought to travel intellectually in the opposite direction namely involution as well. What are the primary distinctions between the brains of God-like men and intellectual stalwarts on the one hand, and the normal brains like ours. How are the brains in the lower order animals? The amoeba has neither brain nor heart. Does it follow that it has no intelligence, no emotion and no ‘consciousness’. The

facts are that consciousness cannot be located, heart is simply a mechanical pump, and amoeba does have consciousness in a less evolved state.

Raghavendra Gadagkar has made outstanding studies on ants, bees and wasps and shown the complexities of 'wasp politics'. From the bacteriophage (a virus that infects bacteria) which has gene-programmed 'instinct', and yet 'learns' while staying within the host to alter its genetic composition, to the most sophisticated human being, there is the 'gene-culture continuum' and hence in the opinion of Gadagkar, 'nothing is gained by invoking a definition of consciousness that automatically eliminates animals'.<sup>21</sup>

Down the scale of evolution, the viruses exhibit consciousness. Does consciousness go deeper to non-living objects such as metals, as the famous scientist Jagadis Chandra Bose tried to exhibit? This question has been raised by M.S Valiathan and others (Reference no. 11, pp. 483-484 and 501-503). Swami Jitatananda has provided a detailed assessment of this problem in one of his exhaustively written papers.<sup>22</sup>

It appears to many physicists and philosophers that there is an anthropic principle of consciousness behind the universe which is the sole source of energy. Consciousness permeates even below the viruses down to the non-living objects, molecules, atoms, electrons and other subatomic particles. Brandon Carter and Stephen Hawking have wondered why the Planck's constant is not a little bigger or little smaller, why is the speed of light exactly what it is. How are the two forces: gravitational and strong interaction 'so incredibly fine-tuned'. If the gravitational force were off a little (1 part in  $10^{40}$ ) or the charge of the electron were slightly different, 'the stars would not burn to give us light'!

Is 'thermodynamics', which dictates billions of chemical and bio-chemical reactions in the universe, the other name of cosmic intelligence? The architecture arising out of tetravalent Carbon atoms is fabulously intelligent. So is the unique H-O-H bond angle without which we would not have the marvellous properties of water molecules so crucial for the sustenance of life. Consciousness seems to transcend not only the human brain but the entire created universe!

#### **SOME CONCLUDING REMARKS**

The pursuit of consciousness research is an exciting endeavour which may not yield immediate dividends and permanent reconciliation of science and religion, and yet demonstrates the syncretistic nature of science itself. Sri Ramakrishna

encouraged physiological inspection of his *samâdhi* state and its psychological interpretation. He appreciated the principle of causality and the search for the root cause of all energies, the search for the grand truth. Since direct experience (*vijñâna*) is better than mundane bookish knowledge (*jñâna*), he counselled the experiential approach more than the experimental, but never discouraged the latter, particularly modern science and technology.

Swami Vivekananda went one step further. In his scintillating lecture ‘Reason and Religion’ delivered in England, Swamiji categorically stressed that religion has to justify itself through reason, the spirit of science :

“Is religion to justify itself by the discoveries of reason, through which every other science justifies itself ? Are the same methods of investigation, which we apply to sciences and knowledge outside, to be applied to the Science of Religion?

“In my opinion this must be so, and I am also of opinion that the sooner it is done the better. If a religion is destroyed by such investigation, it was then all the time useless, unworthy superstition ; and the sooner it goes the better.....

“All that is dross will be taken off, no doubt, but the essential parts of religion will emerge triumphant out of this investigation. Not only will it be made scientific—as scientific, at least as any of the conclusions of physics or chemistry— but will have greater strength, because physics or chemistry has no internal mandate to vouch for its truth, which religion has”.<sup>6</sup>

This is the verdict in favour of science. Spirituality transcends reason, supersedes reason, but contradicts it not. Religion has to follow scientific methodology even though its domain is deeper within, in the subjective world of mind and meditation.

Unfortunately, the majority amongst the scientists, the physicists would not accept metaphysics so easily. They would not accept ‘God’ without demonstrated proof. They would not even try the path of meditation at the words of a saint of impeccable character. Nobody has faced this truth as well as Fritjof Capra, the author of *The Tao of Physics*. He had himself wondered how to pursue Physics and Metaphysics at the same time, when his mentor, the sage Krishnamurti told him : “First you are a human being ; then you are a scientist”.

Fritjof Capra was specifically interviewed on the issue of a possible synthesis of Science and Religion, and we may note some of the points which he

made during the conversation.<sup>23</sup> Physics may be defined as the principal science of non-living systems, but the center of the world-view must be the living systems, the mind, the consciousness. There has to be a shift in our entire approach towards Science, through a greater concern to quality rather than quantity. We know how to 'measure' blueness without knowing what it is ! Then Nature, the living Cosmos, is too large for us to control in the Baconian sense. We must adopt the mystical tradition to study reality through meditation, then understand, cooperate and attune ourselves with Nature, cultivating humility and a strong ecological sense. There has to be a profound change of heart on behalf of the scientist working for the military and inventing violent weapons.

The lofty claims of mysticism provide inspiration to Science on two counts. Firstly, the vision of *advaita* or non-duality in the created world has been sub-consciously simulated by scientists seeking unity of matter and energy and unity of the scientific laws. Albert Einstein's Grand Unification Theory (GUT) combining the five different kinds of forces in the universe is sought to be upgraded to Stephen Hawking's Theory of Everything (TOE). This vision is yet to be achieved, and the dream continues.

Secondly, the age-old mystic experiences, as catalogued by Debabrata Sen Sharma<sup>24</sup>, are of different hues : vision as light (*jyoti*), unstruck sound (*anâhata nâda*), fragrant smell, bliss (*ânanda*) and upsurge of love for all creatures (*prema*) deep within the heart. The *Advaita Śaiva* texts have described the mystics with benevolence, compassion and joyfulness to possess the excellent quality of *prema* and 'willingness to work for alleviating the suffering of their fellow-beings' (Reference no. 25, p.237). This is an inspiring vision. Natural science, which is basically neutral as far as ethics is concerned, need not remain so and stagnate within social aimlessness. It should serve, rather than dominate. It should prefer ecological sanity and universal well-being, rather than technological consumerism and military adventurism. Through logic, statistics and mathematics, it can considerably aid sociometry, econometry, social sciences, social engineering, planning for the future etc. It can join hands with spirituality (minus theological dogmatism) and spiritual socialism or *sâmya* encompassing *egalite*, *liberte* and *fraternite*.

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