

Buddhism and Science – A Century of Investigation

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ABSTRACT

The earliest currently accessible discussion on Buddhism and Science is Part V of Henry S. Olcott's Buddhist Catechism, published in Sri Lanka in 1881. A treatise on the subject embodying Dr. Paul Dahlk's research in Germany appeared in London in an English translation by Bhikkhu Silacara in 1913. Since then several scholars and enthusiasts have investigated issues of compatibility, parallels and contact points. This paper seeks to serve as a survey of this century-long investigation. The purpose is to highlight the different approaches adopted by the writers as well as to identify points of convergence and divergence.

INTRODUCTION

If science is defined as the knowledge of physical, chemical, biological factors, processes and laws of nature, its exploration is as old as the human race. So is the human search for the meaning of life with questions like how, why and wherefore we are here, leading to the origin of religion relating to spiritual, ethical and after-life concerns. As religion gained dominance in the sphere of human thought the scientific and technological knowledge, despite its contribution to ease and comfort of human existence, was rated inferior. The spiritual overtones of religion claimed superiority over the materialistic utilitarianism of the other. So did the Vedic thinkers distinguish religious thought as *parā vidyā* (superior knowledge) and all others as *aparā vidyā* (inferior knowledge). (Hajime Nakamura 1983 521-523). Kathopanishad (II 1) distinguished them as Śreyas (Greater) and Preyas (Pleasant). Buddhist thought, too, distinguished between *lokottara* (supramundane) and *lokīya* (mundane or more precisely materialistic). The continuation of this competition is evident in the early struggle which modern science experienced in its attempt to gain recognition in academia. Science was not readily accepted as worthy or appropriate subjects of study in classical universities which, founded on their faith-based origin, concentrated on Humanities and Arts. The recognition of science, engineering and technology, as legitimate fields of formal higher education had to wait for innovative steps like Land Grant Colleges taken in the New World.

While no evidence of any religion vs. science confrontation is found in ancient Egyptian, Sumerian, Indian, Chinese or Greco-roman cultures, Christianity in the Middle Ages was deeply involved in reacting violently when scientific discoveries questioned church directed views of nature. Already in the sixteenth century the church hostility towards emerging modern science based on research and experimentation was reflected in the condemnation of Copernicus' discovery of the Heliocentric planetary system and consequently in the inordinate

oppression and pressure to which Galileo was subjected by the Roman Inquisition for upholding, what it called the “Copernican heresies.”

With Charles Darwin’s theory on Evolution based on natural selection and survival of the fittest, the dividing line between religion and science became sharper.

The biblical criticisms by Thomas Payne, Bishop Cabezon, Ingersoll and others in the nineteenth century contrasted faith-based traditional Christian views with research-based objective findings in respect to the origin and history of humanity, the world and the universe in general. By mid-nineteenth century, a measure of disenchantment with the dogmatic concepts of Christianity arose in circles, which favored modern science and technology. Interestingly, this particular attitudinal change coincided with the discovery of Asian Spirituality and religion – especially Hinduism with its Vedic and Upanishadic antecedents and Buddhism with its vast and varied philosophical literature. The founders of the Theosophical Society in 1875 specifically drew attention to the openness of Eastern religions. In a letter to Sri Lankan Buddhist activists on August 29, 1878, Colonel Henry Steel Olcott wrote

“Physical Science is tearing down the barriers from behind which a fraudulent caste have so long entrenched themselves and ruled the consciences and destinies of the people, at the same time beclouding their perceptions of spiritual things. Christianity is losing its adherents by tens of thousands and the past vestiges of its ancient influence are almost now swept away.” (Guruge 1984 339).

It is, therefore, not surprising that the earliest known document to be entitled “Buddhism and Science” is traceable to its Founder-President, Olcott.

What I propose to do is to trace the investigation of the compatibility, or otherwise, between Buddhism and Science starting from the comments of Olcott dated 1881 to those of recent Buddhist analysts in the traditionally Buddhist countries of Thailand and Sri Lanka. On what theoretical constructs were their investigations based? How reliable and acceptable are their findings? What conclusions can we derive from the present state of our knowledge? These are the questions for which this analysis will seek answers.

Mine will be a survey of the available literature and, to be concise, no critical evaluation of the points of view expressed will be attempted other than in a general way.

**“BUDDHISM AND SCIENCE”
BY COLONEL HENRY STEEL OLCOTT, 1881**

A discussion in the Question-and-Answer format, under the title “Buddhism and Science”, forms Part V of Olcott’s “The Buddhist Catechism”, which he finalized in Sri Lanka under the guidance of Hikkaduwe Sri Sumangala Nayaka Thera, with whose certificate guaranteeing authenticity the book was published in Colombo in 1881 and London 1889. For my analysis, I utilize its 1915 edition published in Colombo with Questions 325 to 383.

Olcott was not a scientist, even though he is credited with successful application of scientific agriculture. A military officer of the American civil war moving into journalistic and legal careers culminating as a Theosophist dedicated to religious pluralism, he chose Buddhism as his personal religion in 1880. One would hardly expect from him either an exhaustive or a professionally systematic analysis. He opens the discussion with the question whether Buddhism has “any right to be considered a scientific religion” (Q.325) but does not answer it. Instead, he explains that “Buddhism is not a revealed religion” as the Buddha “gave it out as the statement of eternal truth, which his predecessors taught like him.”

With a reference to Kālāma Sutta “as telling us not to believe in an alleged revelation without testing it by one’s reason and experience,” Olcott mentions the Buddhist concept that “nothing ever came out of nothing” and asserts, “Everything is in a state of constant flux, and undergoing change and reformation, keeping up the continuity according to the law of evolution.” (Q327)

As a further endorsement of Buddhism by science, he argues that Buddhism “teaches that there were many progenitors of the human race” (as opposed to the Genesis theory of Adam and Eve) and there prevails a principle of differentiation among people. He skips answering his own question as to whether Buddhism should be called a chart of morals and prefers to classify Buddhism “as a pure moral philosophy, a system of ethics and transcendental metaphysics.” (Q331)

Then as an illustration of the congruity of Buddhism and science, Olcott refers to the fathom-wide six colored rays said to emanate from the Buddha’s body, and asks the question “What great scientist has proved the existence of this aura by carefully conducted experiments?” He responds to the question by mentioning the research of Baron von Reichenbach published in 1844-45 and photographs taken by one Dr. Baradue of Paris. (Q345) One may hardly be convinced of this as a significant compatibility between Buddhism and science!

The next illustration is a miraculous reduplication of himself by Cullapanthaka, which Olcott explains as an instance of “Hypnotic suggestion” and equated to “Mesmerism and hypnotism,” that he calls a “branch of science.” (Q360) This again is a point of view with which many may not agree.

The next question is whether the theory of Karma is supported by “modern scientific belief.” (Q361) Here he sees a distinct discontinuity: “Modern scientists teach that every generation of men is heir to the consequences of the virtues and the vices of the preceding generation,” whereas Buddhism considers each individual as dependent on causes generated in a previous birth. Perhaps to indicate that there is still a parallel with modern scientific thinking, Olcott quotes the Vāsethasutta, “The world exists by cause, all things exist by cause, all things are bound by cause.” With this he apparently connects the idea of indestructibility of matter when he attributes to Buddhism the concept that everything – humans included – constantly change not to disappear but to “evolve another universe with all [its] contents.” (Q364)

From this he proceeds to call *iddhividhiñāna* (i.e. knowledge pertaining to miracles) a “branch of science,” inferring that occult powers ascribed to arahants have a scientific base. (Q369) The somewhat long-drawn discussion on this theme leads him to the conclusion that one who possesses *iddhi* (miraculous power) “can by manipulating the forces of Nature, produce any wonderful phenomenon, i.e. make any scientific experiment he chooses.” (Q379)

Olcott’s discussion of Buddhism and Science concludes with a question relating to references in Buddhist texts to “devas” and similar beings (called collectively elemental invisible beings). He accepts their existence as a fact and ends this section of “The Buddhist Catechism” with the statement, “no man, god, brahmarakkhas, demon or deva can injure him [i.e. one who is pure and compassionate in heart], but some have power to torment the impure, as well as those who invite their approach.” (Q383)

In 1893, Olcott’s protégé, Anagrika Dharmapala re-echoed similar ideas in his address to the first parliament of world religions.

“Sir Edwin Arnold says: ‘I have often said, and shall say again and again, that between Buddhism and modern science there exists a close intellectual bond. When Tyndall tells us of sounds we cannot hear, and Norman Lockyer of colours we cannot see, when Sir William Thompson and Prof. Sylvester push mathematical investigation to religion almost beyond the calculus, and others still bolder, imagine and try to grapple a space of four dimensions, what is all these except the Buddhist Maya? And when Darwin shows us life passing onward and upward through a series of constantly improving forms towards the better and the best, each individual starting in new existence with the records of bygone good and evil stamped deep and ineffaceably from the old ones, what is this again but Buddhist doctrine of karma and Dharma? Finally, if we gather up all the results of modern research, and look away from the best literature to the largest discovery in physics and latest word in biology, what is the conclusion—the high and joyous conclusion—forced

upon the mind, if not that which renders true Buddhism so glad and so hopeful?”

Asking himself the question, “**Can the knowledge of religion be Scientific?**”, Olcott replied “Buddhism is a scientific religion, in as much as it earnestly enjoins that nothing whatever be accepted on faith. Buddha has said that nothing should be believed merely because it said. Buddhism is tantamount to a knowledge of other sciences.”

If the treatment of this subject in 1881 appears unconvincing, if not puerile and idle, where lay the problem? Was it the state of development of science in the nineteenth century? Or was it Olcott’s background? Olcott, being a spiritualist who believed in Himalayan adepts, spirits of the dead invited to séances, hypnotism, mesmerism and occult powers, along with Madame Helena Petrovna Blavatsky – the Co-founder of the Theosophical Society, was far more gullible than one would expect a scientist to be. (Plethero 1996 454) The recent reissue of these twenty pages in book form in 2005 in USA makes one wonder whether a revival of his concepts is imminent at least in some circles.

**“BUDDHISM AND SCIENCE”
BY PAUL DAHLKE, 1913**

A more comprehensive investigation was undertaken at the beginning of the twentieth century by a German physician, Paul Dahlke. His work was made available in English by Bhikkhu Silācāra as “Buddhism and Science” published in 1913 by Macmillan and Company, London. This book of 250 pages starts with a discussion on what a World-Theory is and explains why a World-Theory is necessary. Presenting Religion as a faith-based world-theory and Science a world-theory based on the premise that nothing in the play of world-events is not perceptible to the senses and hence it is possible to make tangible to sense the entire play of world-events (p.14). Observing also that faith is “a form of mental life which from this fact draws the inference that for the human mind a real comprehension is impossible since behind the physical there stand something transcendent” (p.8), he sees as a distinguishing feature of science that every scientific “law without exception, is an abstraction from experience, and may be swept away again by fresh experiences.” (p.16) From this initial position taken by Dahlke, it becomes clear that he, himself, unlike Olcott, was a man of science. It is also possible that scientific thought had since become more sophisticated by the dawn of the new century.

It is evident right from the beginning of Dahlke’s analysis that the hypothesis he had chosen to investigate and establish assumes a high degree of compatibility between the teachings of Buddhism and the emerging scientific thought of Europe. He laments that “the truest of all teachings, uncomprehended in philosophy, unheeded by natural science, is lost to us and to the needs of our time.” The purpose of the book thus is to remedy this situation.

Accordingly, Chapters IV and V are devoted to an “Introduction to the Thought World of the Buddha Gotama” and the “Doctrine of the Buddha” and Chapter VI to present “Buddhism as a Working Hypothesis.” It is on this theoretical foundation that Paul Dahlke takes up a detailed analysis of Buddhism in relation to what he calls “the problem” of each of the following disciplines of Science: Physics, Physiology, Biology, Cosmology, and, finally, Thought. A brief two-page conclusion brings the book to a close.

Chapter IV is an adulatory appreciation of Buddhism digressing into its Aryan origin and the uniqueness of Pali as a medium of philosophical discussion: Paul Dahlke sees in Indian philosophical search some significantly unique features which he summarizes in the following statements:

1. **A life of suffering:**

“...the fundamental theme in this Indian symphony of destiny, recurring in unending variations was this, *Life is Suffering*, or to say the least of it, a somewhat doubtful blessing. But this statement of life as suffering was not in ancient India the hollow phrase that it is with us today; neither was it that cold play of thought found in many philosophical systems. It was a grim reality which men sought to escape with an energy of self-immolation, a determination, a recklessness, an ardour of which we lukewarm creatures of to-day can form no conception.” (p. 25)

2. **In one’s own I rather than rhetorical disputations:**

“The sons of noble families left their homes to search for truth either out there in the frightful solitudes of the Indian forest, or in the cloister of the monk. As in later days men went forth in search of El Dorado, so in those days did men go forth upon the search for truth? But what gives to the search for truth in ancient India a character entirely its own is this, that all search here is turned towards the *I* itself; that the fight for truth did not as in ancient Greece exhaust itself in elegant rhetorical disputations and exercises in dialectic, but in full unmitigated rigour was lived out in one’s own *I*, without a single thought as to whether the outward form would support the heat of the friction within or not.” (p, 25)

3. **One single thought:**

“In one of the Buddhist monk’s chants there occurs the phrase, “One single thing – he thinks it out!” This in few words, is what the Buddha did. He thought out to an end, *one* thought – the thought of transiency.” (p. 26)

Paul Dahlke's admiration of the Buddha's teachings finds expression in a series of enthusiastic appraisals:

"I will not call his teachings the grandest or the deepest of all teachings but the teaching of the Buddha is more than this – *it is actual*. Through this it obtains that really compelling character such as is possessed by actuality alone. For there is only one thing that is compelling – truth; and there is only one thing that is true – actuality." (pp. 26-27)

"Through this its truthfulness, his teaching has conquered half a world; not by fire and sword but even as truth conquers, by demonstration, by teaching. And so it now stands, old by two thousand years, before the portals of western culture, and claims entrance not into the cloudy domain of a vague mysticism or a crude pantheism, but into the realm of clean thinking, as fulfillment of that which never can be attained by means at the disposal of science." (p. 27)

"One can place on one side not only all the religions of the world but also all the philosophical and scientific systems, and upon the other Buddhism will take its place alone." (p.27)

"[The Buddha] alone seized at one grasp the entire ever-changing host of doubts and questions by the root, with the daring of genius demanding to know the right to exist of life itself." (pp. 28-29)

He concludes this appraisal of Buddhism by defining it as the teaching of actuality. In fact, he repeats many times in this Chapter as well as elsewhere in the book the sentence: "*Buddhism is the teaching of actuality*," emphasizing that his analysis of the relationship between Buddhism and Science is founded on this definition.

Paul Dahlke makes a distinction among "*Science*" as dealing with things perceptible to senses and hence "materialistic" and "mechanical", "*faith*" which believes in what is imperceptible to senses as an adequate cause in itself (i.e. "God") and "*Buddhism*" which deals with what is actual and present. Referring to the Fire Sermon, (i.e. *Ādittapariyayasutta – Vinaya I 34-35*) which he calls the "Sermon of the Mount" of Buddhism, he elaborates this distinction further:

"Faith says, '*Everything stands*' – namely, in the place in which it has been set by that 'force in itself,' God. Science says, '*Everything falls*,' which means that she neglects actual forces in general. The Buddha says, '*Everything burns*,' meaning that, every process exists in virtue of a single *in-force*, peculiar to itself." (p.45)

Dahlke has identified the following doctrines of the Buddha as characterizing the specificity, which he attributed to Buddhism:

- 1) Sankhara -
“The Buddha concurs with modern science in so far as it rejects an uncompounded or unconditional, a unity in itself, a soul substance, or whatever else one chooses to style it.” (p.40)
- 2) Kamma -
“Every living being is here in virtue of individual force peculiar to him alone.” (p.41) “*I am the form of my Kamma. I am my Kamma corporealised.*”
- 3) Pancakkhandha -
“In every motion, corporeal as mental, physical as psychical, *I am the form of Kamma itself.*” (p.44)
- 4) Anattā -
“It only means that they do not conceal within them a “force in itself,” a “constant in itself,” but are *out and out processes of combustion, of alimentation*, such as cannot conceal any “constant in itself,” since at every moment of their existence they represent a fresh biological value, and hence hold nothing that could possibly justify the notion of an *I-identity*, a genuine self.” (p.44)

“This insight into the *I* as a pure combustion process places the whole problem of existence upon an entirely new foundation.” (p.51)

“*At every moment of my existence I am the final member of a beginningless series of 'I-sayers.'*” (p.56)

- 5) **Dependent Origination** –
“In every one of its activities, at every moment of its existence, the *I*-process is not something that possesses arising as function, but it *is* the arising itself, as the flame *is* the arising itself. And it *is* the arising itself because it burns, because it exists in virtue of an individual energy. It is the thirst for life, the impulsion towards life, which *upholds life*, causes it ever and again to spring up anew, and *is life itself*; in exactly the same way that the heat of a flame upholds the flame and is the flame itself.” (p. 52)

“The Buddha teaches *that every being is adequate cause to itself.*” (p. 53)

- 6) Saṃsāra -
“Without beginning, without end is this Saṃsāra. A beginning of beings encompassed by nescience who, fettered by the thirst for life, pass on to ever new births, verily is not to be perceived.” (p. 57)

7) Viññāṇa-

Only when one understands that Viññāṇa (consciousness) is Kamma itself, does a “consciousness” that passes over from existence to existence become divested of its seeming senselessness.” (p.62)

“He who is born is he the same or is he another?” “Neither the same, neither another.” (p. 64)

He summarizes his understanding of the Buddha’s doctrines as follows:

“The Buddha teaches: “All actual processes are combustion processes. They burn in virtue of purely individual *in-forces* (Kammas). As such they are self-sustaining processes. They have sustained themselves from beginninglessness down to the present by volitional activities. With the Kamma-teaching the significance of Buddhism for a world-conception is given in all its amplitude. To possess a world-conception means to comprehend the play of world-events. To comprehend means to comprehend adequate causes. Adequate causes must be forces. Forces of necessity must be something imperceptible to sense. As such they must lie beyond the reach of all comprehension. An exception to this is constituted by one single process - the *I*, the individual himself; inasmuch as the *in-force*, in virtue of which I have my being, *becomes* perceptible to sense in consciousness.” (p. 70)

Returning to his threefold analysis, as regards conservation of energy, he concludes,

“Religious faith endeavours to satisfy with its “force in itself” “God.”

“Scientists endeavour to satisfy it with ‘matter,’ which is as much a thing of faith as is ‘force’.”

“Actuality [with which Paul Dahlke identifies Buddhism] knows neither force by itself nor matter by itself, it only knows the unity of both processes.” (p. 72)

Increasingly demonstrating his adulation, for Buddhism as a system of advanced, all-inclusive thought (as opposed to faith and belief) with such statements as “Only the Buddha has or could say” and “Only Buddhism states,” the author proceeds to discuss causality as highlighted in Buddhism. He ends the chapter with a detailed examination of the twelve links of *Paṭiccasamuppāda* (Dependent Origination) with special reference to the role of *Taṇhā* (craving) as the overriding factor affecting rebirth. His conclusion is graphic:

“In the intuition of the beginninglessness of the individual, both series - the actual as the Kamma-teaching, and the abstract as the teaching concerning ignorance - merge into one. Buddhism is the teaching of actuality. The actual is only what I myself experience –I, the *I*-process. The Buddha teaches me to comprehend myself, and only as a function of this self-comprehension does there follow a comprehension of the external world. A view of the world based solely upon a comprehension of one’s self perforce lies beyond reach of any inductive procedure; the question, therefore, arises: By what means and method is such a doctrine to be brought within reach of others?” (p. 80)

This last question leads him to his in-depth investigation of Science. It begins with a philosophical analysis of Faith, Knowledge, Consciousness and Intuition. Viewing the Buddha-teaching as pure intuition; he makes two statements, which stress the inability of Science to function as an aid to master Buddhism:

1. “Though I lay the Buddha-teaching before the ablest scientific man that ever lived, it must always remain for him an entirely insipid thing if his intellectual faculty is not in such a condition as to vibrate in harmony with it, react to the “provocation” offered, work it up, assimilate it.” (p. 84)
2. “In respect of the teaching it is with such minds as it is with many desert regions of the torrid zone in regard to rain: their overheated soil prevents the rain-clouds that pass over them year after year from discharging their burden. They receive no rain, not because they are soaking with water, but because they are too parched and dry. They come under the law of the *circulus vitiosus* (*Vicious circle*). Because they are rainless no vegetation can come; and because they are without vegetation no rain can come. Here there is nothing to be done but wait patiently until some time in the course of the beginningless, incalculable play of world-events a seed sprouts, a drop of water falls, and so a happier circle sets in which, with the increasing vegetation, increases the capacity for drawing down rain, and with the increasing rain-fall increases the capacity for bringing forth vegetation. **In the selfsame way, in the case of those minds that are overheated with theories, there is nothing to be done but wait patiently, point out and point out again and again, until one day in the course of the beginningless, incalculable play of world-events some first grain of the teaching sprouts, some first drop of genuine insight falls.**” (p. 85 – emphasis mine)

With such an approach, one is not surprised to encounter repeated explanations of Science as inadequate: e.g.

“Science in all its forms, without exception, is nothing but a methodical description of occurrences. All its “explanations,” without exception, are only so many skilful forms of description.” (p. 91)

“The knowledge which science supplies us is the most pregnant possible expression for our ignorance. Were a genuine comprehension in question, one would make a speculation of it like a man who should buy up all the tickets in a lottery in order to make sure of the first prize.” (p. 99)

It is with such an exhaustive explanation of his conviction that Science needs Buddhism rather than vice versa that he defines his objective:

“Our task here is to throw the light of the Buddha-thought upon these problems, and to this task we now proceed to address ourselves.” (p.109)

Thus Paul Dahlke proceeds to examine in the rest of the 146 pages the problem of Physics, Physiology, Biology, Cosmology and Thought. Each chapter is a learned analysis of the nineteenth century scientific concepts in each field and among the problems chosen for comparison with Buddhist ideas are **telekinesis, procreation, heredity, natural selection and evolution, spontaneous generation and concept-formation**. The last chapter illustrates the early stages of the emerging discipline of psychology.

The overall conclusions of Paul Dahlke are best represented by the following quotes:

1. “When **Science** teaches that I am descended wholly and entirely from my parents..... **Faith** teaches that the parents provide the material while God sets all alight by endowing me with an immortal soul..... The **Buddha** teaches: **The parents provide the material, the ground work, and the I-energy of some disintegrating I-process, corresponding uniquely to these potentialities, sets all alight.** Thus of the three, the **Buddha** is the only one to abide by actuality, the only one with whom the entire miracle of propagation takes its place among mundane events, conforming likewise to the laws of mundane occurrences. For **faith**, the miracle of propagation lies outside the jurisdiction of these latter; for **science**, it is true it remains within their jurisdiction, but only as a barren possibility.” (p 146-emphasis mine)

2. “If science and Buddha-thought be placed alongside one another for mutual and unbiased comparison, perforce the superiority of the latter must be acknowledged, since by it is neatly resolved in one single conception that which science with two distinct concepts makes an inextricable tangle of.” (p. 168)

Paul Dahlke’s investigation seems to be affected both by his working hypothesis that Buddha-thought was superior to *science* as well as faith-based concepts of other religions *and* the state of the nineteenth century scientific thought which apparently was yet in its infancy. Perhaps, an added reason for Dahlke’s tone could be that he was reacting to the arrogant superiority, which some scientists may have displayed. In any case, one may not consider this serious attempt to compare Buddhism and Science as a totally objective investigation.

**“BUDDHISM AND THE SCIENTIFIC REVOLUTION”
BY K. N. JAYATILLEKE, 1950**

K.N. Jayatilleke’s essay on “Buddhism and the Scientific Revolution” written in the 1950s and published widely (also reproduced in Buddhadasa P. Kirthisingh’s “Buddhism and Science” to which page numbers in this section refer), looked for points of agreement. Jayatilleke notes with satisfaction,

“Science too has given up the crude materialism of the eighteenth century and scientists no longer attempt to explain the universe on machine models, while some scientists have denied that strict determination holds in the sphere of the atom.” (p. 9)

The following illustrate his approach:

- a) “the Early Buddhist conception of the **cosmos**, is in essence similar to the modern conception of the universe. In the Pāli texts that have come down to us, we are literally told that hundreds and thousands of suns and moons, earths, and higher worlds, constitute the minor world system, that a hundred thousand times this, is the middling world system, and a hundred thousand times the middling world system, is the major world system. In modern terminology, it would seem as if a minor world system (*culanikā-loka-dhātu*) is a galaxy of which we observe about a hundred million through our best telescope. The Buddhist conception of time is equally immense.” (pp.9-10)
- b) “Then in **psychology** we find Early Buddhism regarding man as a psycho-physical unit whose *‘psyche’* is not a changeless soul but a dynamic continuum composed of a conscious mind as well

as an unconscious, in which are stored the residua of emotionally charged memories going back to childhood as well as into past lives. Such a mind is said to be impelled to act under the influence of three types of desires the desire for sense-gratification (*kāma-taṇhā*), the desire for self-preservation (*bhava-taṇhā*) and the desire for destruction (*vibhava-taṇhā*). Except for the belief in rebirth, this conception of the mind sounds very modern, and one cannot also fail to observe the parallel between the three-fold desire in Buddhism and the Freudian conception of the eros, libido, and thanatos.” (p. 10)

- c) “Critical investigation [as per **Kālāma Sutta**] and personal verification was to be the guide to true morality and religion.” (p. 10)
- d) “The field of **moral and religious phenomena** is, again, not a realm of mystery but one in which the law of cause and effect holds.” (p. 11)
- e) “Thus all phenomena, including the moral and spiritual experiences (with the sole exception of Nirvāṇa which is not a conditioned phenomenon), are said to be conditioned by **causal laws**. Such laws are classified according to their sphere of operation as physical laws (*utuniyama*), biological laws (*bijaniyama*), psychological laws (*cittaniyama*) and moral and spiritual laws (*dhamma-niyama*).” (p. 11)
- f) “There is the spontaneous evidence of numerous people from both East and West who have claimed to remember their past lives, in some cases the memories have been confirmed by further investigation (e.g., the case of Shanti Devi, *The Illustrated Weekly of India*, December 15, 1935; the case of Nellie Horster, *Milwaukee Sentinel*, September 25, 1892). There is also the more reliable and abundant evidence of psychiatrists and psychologists who have discovered that under hypnotic trance the subject’s memories can be traced back not only to childhood but to prior earth lives as well; in some cases the facts have been verified (e.g. A. de Rochas, *Les Vies Successives*, Bibliotheque Charcomac, Paris; Ralph Shirley, *The Problem of Rebirth*, Rider & Co., London; Professor Theodore Flournoy, *Des Indes a la planet Mars*; Professor Charles E. Cory, “A Divided Self”, in *Journal of Abnormal Psychology*, Vol. XIV, 1919).” (p. 12)

The conclusion he draws after a lengthy discussion of Nibbana is:

“As such, Buddhism is not likely to be at variance with science so long as scientists confine themselves to their

methodology and their respective fields without making a dogma of materialism.” (pp. 15-16)

Jayatilleke's article is still considered to be an influential contribution to the discussion on the subject. (Wallace 2003 p. 47)

SEARCH FOR SCIENTIFIC EVIDENCE FOR REBIRTH – RESEARCHES OF IAN STEVENSON AND OTHERS 1966 ONWARDS

What K.N. Jayatilleke mentioned above in passing became the subject of lifelong study and research for Ian Stevenson M.D., Professor of Psychiatry at the University of Virginia, and his writings on the subject date from 1966, with a pioneering publication of twenty cases suggestive of reincarnation. His choice of the term reincarnation, which is defined as the transmigration of souls from one life to another, taking a new body each time, reflects his concept that the phenomenon as a pan-world occurrence is not confined to any particular religion. His subjects have come from all continents and widely varying cultures. But the study of the phenomenon has been significantly facilitated by cultures professing Hinduism, Buddhism and Jainism, where rebirth in a cycle of birth and death is an article of faith. As a significant proportion of the cases in which he claims to have found adequate evidence to suggest rebirth the plausible explanation are connected with Buddhism, he is relied upon by many Buddhists as having provided scientific proof in support of the Buddhist belief.

Reports of people recollecting their previous lives come from a variety of sources. Those obtained through hypnosis are given less credence because such past-life memories could have “rational explanations, for example Cryptomnesia (the emergence of forgotten memories), suggestibility, fantasy or imagination, hypothetical dissociation, wishful thinking or self-delusion (Elizabeth Fenwick www.scimednet.org/bibliography/para_reincarnation).

Ian Stevenson has analyzed over 2600 reports of past-life memories over four decades especially of children who claimed knowledge of previous births. His method has been to record the statements, verify them with visits to locations associated with such memories and confronting the children with previous events, persons, and experiences of such locations. In the process he as well as his associates connected with the research would ensure that such memories were not generated by any source other than real experience. The small number of cases, which he had accepted as suggestive of rebirth is by itself proof of the stringency of his process of elimination of every doubtful factor.

When the past-life memories are also supported by children using unlearned languages relating to previous life or lives or by the ability to recall scriptures, songs and texts of which they have no knowledge in the present life (i.e. xenoglossy), the reliability of these memories is substantially enhanced.

A further element of reliability is introduced in Ian Stevenson's study of birthmarks and birth defects, which are associated with injuries suffered in the case of violent deaths during a previous life. Here again, all one has to go on is the correlation of birthmarks and birth defects with what the subject recollects as injuries suffered.

Ian Stevenson's work has won him recognition as a meticulously conscientious researcher even though skepticism continues to be expressed in scientific circles, which reject his data as heresy and testimonial evidence.

Despite such skepticism, many other scholars have produced a voluminous body of literature, which has revamped the faith that Buddhists as well as Hindus and Jains have in the phenomenon of rebirth or reincarnation. They show little hesitation in rejecting past-life memories as totally unreliable, especially after correlations are carefully established.

Elizabeth Fenwick, herself the co-author of The True in Light, Past Lives and Hidden Door with Peter Fenwick lists the following as key texts.

- Stevenson, Ian, *Children who Remember Previous Lives*, University Press of Virginia, Charlottesville. 1987. ISBN 08139
- Stevenson, Ian, *Reincarnation and Biology: A contribution to the Etiology of Birthmarks and Birth Defects* (Two Volumes). Praeger Publishers, West Port CT 1997. ISBN 0 275 95282 7
- Stevenson, Ian, *Where Reincarnation and Biology Intersect* Praeger Publishers, West Port CT, 1997. ISBN 0275 95188 X
- Stevenson, Ian, *Unlearned Language: New Studies in Xenoglossy*, University Press Virginia. 1984
- Fenwick, Peter and Elizabeth. *Past Lives Headline*, 1999. ISBN 0 7472 1841 2
- Cockell, Jenny, *Yesterday's children*. London, Piatkus Books, 1993. ISBN 07499 1246 4.
- Pasricha, S. 1990 *Claims of Reincarnation: An Empirical Study of Cases in India*. Harman Publishing House, New Delhi.
- Ten Dam, Hans *Exploring Reincarnation*, London, Arkana, 1987. ISBN 1 85274 084 1.
- Woolger, Roger *Other Lives, Other Selves*, London, Crucible, 1987. ISBN 1 85274 084 1.
- Bowman, Carol *Children's Past Lives*, Shaftesbury, Element, 1997. ISBN 1 86204 149 0.
- Weiss, Brian L. *Many Lives, Many Masters*, London, Piatkus, 1994. ISBN 0 7499 13789.
- Weiss, Brian L. *Through Time to Healing* (Patikus, 1992)
- Legget, D.M.A. and Payne, Max *A Forgotten Truth*, Pilgrim Books, 1986. ISBN 0 946259 14 3.

- Head, Joseph and Cranston, Sylvia *Reincarnation: The Phoenix Fire Mystery*. New York, Julian Press, 1977. ISBN 0 517 528932.
- Cranston, Sylvia *Reincarnation: A new Horizon in Science, Religion and Society* (with Carey Williams, Julian Press, 1984).
- Hick, John, *Death and Eternal Life* (Collins, 1976), Chapters 16-19. Geddes McGregor's book *Reincarnation in Christianity* (Theosophical Publishing House, 1978). (www.scimednet.org/bibliography/para_reincarnation).

“BUDDHISM AND SCIENCE”

BY BUDDHADASA P. KIRTHISINGHE (EDITOR), 1984

A third work, with the title of “Buddhism and Science” by Sri Lankan interplanetary biologist and evolutionary scientist, Buddhadasa P. Kirthisinghe (published in 1984 by Motilal Banarsidass, New Delhi and reprinted in 1993, 1996, 1999 and 2004) is a collection of twenty-two articles: six by the editor, eight by Gerald Du Pre, two by Upāsaka Wu Shu and one each by K.N. Jayatilleke, Robert F. Spencer, Bhikkhu Ñānajivaka, Shānti Tayal, Lao Yung Tsung, , U Aung Thein and F. Mark Davis. According to the editor,

“It is hoped that it would be evident from a reading of these diverse essays that **Buddhist philosophy blends well with science in its various fields**. Just as Buddhist views in regard to the universe do not clash even with the most modern concepts, similarly **Buddhist ideas on philosophy do not clash with the concepts in the various religions**, provided they are analyzed correctly.” (p. xi-emphasis mine)

In the introductory essay, Kirthisinghe discusses the confrontation between the “revealed” beliefs of Christianity and scientific “truths” established by science on “ocular demonstration and verification by experiment” and contrasts it with the mutually friendly relationship between Buddhism and Science. He says,

“**By using the scientific method, the Buddha proved that he was, indeed, a scientist**. Hence from this consideration alone it is futile to ask whether he, his followers or his statements can be considered as scientific or inimical to science. He and his followers, and the whole procedure that the Buddhists employ, are in conformity with and in the spirit of science. Hence, no quarrel could ever arise with people who accept scientific principles or make scientific discoveries. **The Buddha and Buddhists welcome each scientific discovery, each new application of scientific principles, for these could never be contrary to the principles that they themselves employ.**” (p. 4-emphasis mine)

The first essay in the collection is that of K. N. Jayatilleke discussed above. Compared with it, the rest of the articles are either less focused or too sketchy. Bhikkhu Nanajivako engages himself in a comprehensive discussion of modern science and philosophy to establish the point that Science has begun to recognize the Buddhist concept of *Anicca* (Impermanence). He says,

“Yet, just over the edge of our intellectual horizon was dawning a time, for science at least, of acquiring a completely different position vis-a-vis the problem of impermanence and relativity as affecting the deepest subatomic structure of the world - a position considerably closer to the Buddhist idea of *aniccam*.” (p.24)

Apart from seeing some etymological similarities of some terms in Buddhism and Science, Bhikkhu Nanajivako observes parallels such as the following:

- a) “According to Buddhism, the person reaping the fruits of good and bad actions (in a future life) is neither the same one who has committed these actions nor a different one. The same principle applies to the structural identification of a person in any other respect and circumstance, in the stream of one single physical life.” (p. 33)
- b) “In his advanced years, Jaspers has discovered the Buddhist philosopher Nāgārjuna as one of the most congenial minds, while Heidegger, when reading D. T. Suzuki’s *Essays on Zen Buddhism*, confessed that this was exactly what he had tried to express all his life long.” (pp. 34-35)

His concluding statement quotes Nāgārjuna:

“The Buddhist fitting, or “raft”, though considerably larger in its basic frame, is readily adaptable to their explicit requirements: ‘Neither being, or non-being, nor both being-and-non-being, or neither-being-nor-non-being’.” (p.38)

Shanti Tayal M.D., practicing psychotherapy in India and the USA, discusses briefly the Western practice of psychotherapy and observes,

“It is no small wonder that so many Westerners are turning to Eastern philosophies, religions and meditative practices. They find something forceful, something compelling, something relevant in the Buddha’s message. They see in Buddhism a genuine path of escape from the trials and tribulations of this life. The Buddha saw the cure for human suffering in a unique psychology, in the understanding of the mind, the heart, and the

will. He also showed the way leading to this cure. This path, this way, this technique is known as the Middle Way. He showed his way for good of many, happiness of many, out of compassion for the world.” (p. 42)

Presenting the first discourse of the Buddha in summary, he advocates the Eightfold Path as a form of psychotherapy, saying,

“This path is a way of life to be followed, practiced, and developed by each individual. It is a self-discipline and, if I may say so, a self-therapy of body, word and mind. This is the regimen for self-development. This is the prescription for the prevention of the chronic ills of life. You may or may not have belief. Praying may or may not be distasteful to you. No worship is required: there are no ceremonies. This path is a way of life - a point of view in action. It does not require us to renounce this world. It only demands modifying our approach and acquiring a different attitudinal set towards life and our environment. Thus, through rigorous self-discipline, it is a road to self-realization.” (p. 43)

The two articles of Upasaka Wu Shu on “Buddhism and Nuclear Physics” and “Atom and Anatta” are far too brief to be of any contribution to our understanding of the relationship, if any, between the Buddha’s teachings and nuclear physics. Illustrative of the author’s enthusiasm are such concluding statements as:

- a) “9. To the truth-seeker, right knowledge is the microscope, training is the experiment, and the whole universe a perfect laboratory. 10. The teaching of the Buddha furnishes all that a seeker of truth needs to learn and to follow.” (p. 48)
- b) “I have briefly mentioned two of the three fundamental principles of Buddhism, namely *Anicca* (impermanence) and *Anattā* (egolessness). The other important principle is called *Dukkha* (suffering) or the consequence of an egoistic life. These three principles are so important that they are actually considered as the testing-stone of Buddhism. Any theory or philosophy, which is completely in accordance with these three principles, is justified to be called Buddhist; and anything not in accordance with the three is non-Buddhist. From this fact the rational character of Buddhism can be easily judged.” (p.54)

On the other hand, the Burmese biochemist, U Aung Thein describes very briefly Buddhist meditation and discusses a 1964 UCLA experiment regarding the connection between mental activity and production of RNA. Attempting to show that the path of the Buddha is a scientific one, he says,

“I shall conclude with a scientific example related to meditation. It is known that neural transmission is influenced by the presence of calcium ions. Electromagnetic waves of approximately 7 to 13 cycles per second are produced during meditation. If electromagnetic waves of this frequency are impressed upon the brain, there is an efflux of bound calcium from the nerve cell membranes. Recent space experiments of astronauts in a state of prolonged weightlessness in outer space have induced religious or rather spiritual experiences.” (p. 59)

F. Mark Davis’ article elaborates what K.N. Jayatilleke has already shown as parallels in the Buddhist concepts of cosmology as found in *Visuddhimagga* and what is being discovered as the limitless and unending extent of the Universe. He quotes an unnamed Sūtra:

“Many world-systems are full of rock-torn earth Dangerous and destroying.” (p.68)

The five short articles, totaling to 16 pages, of Buddhadasa P. Kirthsinghe promise to cover very ambitious areas such as “Buddhism, Biology and Exobiology,” “Natural Selection and Evolution,” “Karma, Rebirth and Genetics,” “The Universe and Cosmology” and “Galaxies and Śūnyatā.” But unfortunately the treatment is too general – journalistic rather than analytical – and the only impression that they create is that the author is keen to share his admiration for Buddhism. In general tone and approach, his writings resemble those of Paul Dahlke.

The eight articles of Gerald Du Pré, a generalist in the role of a popularizer of both Buddhist and Scientific Thought, are written in a lucid readable style. Informative and thought-provoking, his writings cover both major Buddhist traditions and deal with several aspects of Science. A further feature of his articles in this book is that they are logically organized and stand together as chapters of a single book on the subject. His position as regards Buddhism and Science is clearly stated in the opening paragraphs of the article bearing that title:

“Many Buddhists believe that Buddhism deals in one order of truth, while science deals in another. Some go further and believe that Buddhism and science are in opposition. For their part, many scientists, if they think about Buddhism at all, think it is so much nonsense. I think both Buddhists and scientists misunderstand each other. **I would like, by defining both science and Buddhism, to show that Buddhism is a science. I believe that when this is recognized, Buddhism will be able to have the standing and influence in the West which it deserves.**” (p. 92-emphasis mine)

He sees Buddhism as a growing system of thought and reserves for it his special admiration:

“For two-and-a-half thousand years his work has been tested and enlarged by many brilliant men, and in that time many thousands have succeeded in changing their experience in the way he did. **It is this method, this down-to-earth attitude, this spirit of free inquiry, this combining of logical theory, acute observation and practical application, which has made Buddhism so hard to classify in the past.** In the light of the definition above, however, it can be seen that Buddhism shares all these things with science. I see no reason, and I have looked hard for one, why Buddhism should not be termed a science. It is not a religion, or a philosophy, but a science.” (pp. 94-95-emphasis mine)

Writing in the 1970s to the *Middle Way*, the monthly Journal of the London Buddhist Society, Du Pré saw the links between Buddhism and Psychology and the Buddhist concepts relating to Psychotherapy as the main reason for equating Buddhism to Science. He says,

“It would need to be recognized that it is Buddhism, Prince Siddhārtha was the founder and father of this science, not Wundt or Freud. Moreover, Prince Siddhārtha’s discovery of a radical cure for mental disorganization is sufficient, even without his other contributions, to make him the greatest figure in science, and the greatest it is ever likely to have. Whether or not Buddhism was historically responsible for the rise of scientific psychology, it does not alter the fact that psychology is only a recent extension of Buddhism. If this was recognized, Buddhism would attain the stature in the West which it deserves, and Western science would be given the theory and therapy of experience which at the moment it so clearly lacks.” (p. 96)

He elaborates his argument in the next article entitled “Buddhism and Psychotherapy.”

Du Pré looks for convincing parallels. He states,

- a) “When Buddhist therapy is compared with Western psychotherapy, rather close parallels can be seen. It seems that interview and discussion therapy, such as psychoanalysis, parallels the preparatory discussions, which usually occur between the guru and the pupil in Buddhist therapy. Meditation itself seems to parallel very closely the most common technique

of behaviour therapy. There are some vital aspects of meditation, however, which remain unique to Buddhism.” (p. 99)

- b) “The similarities between desensitization and *dhyāna* are plain to see. In both cases, the patient relaxes his muscles yet remains mentally alert. In both cases, he learns not to react to stimuli with any emotional, mental or behavioural response.” (p.100)

He also sees differences:

- a) “Psychotherapy appears to have no parallel for *vipassanā*. It is *vipassanā* which differentiates Buddhist meditation most clearly from Hindu meditation. It seems that it is *vipassanā* which plays a vital role in the process which eventually takes *dhyāna* therapy that final step to *bodhi*, or awakening, the moment of total cure.” (p. 101)
- b) “Buddhism sees ‘normal’ mental disorganization as the cause, under certain conditions, of an illness called *dukkha*. It has produced a total and irreversible cure for *dukkha*, the cured state being called *nirvāṇa*. If subjected to scientific testing, *nirvāṇa* could prove itself to be an acceptable worldwide standard of mental health.” (p. 101)

His conclusion is:

“There is a pressing need for Western psychotherapy to gain an accurate understanding of Buddhist therapy, and for Buddhist therapy to acquire scientific recognition. If it did so, it could rapidly become the major world-wide treatment for common mental disorder.” (p. 102)

After a discussion of the Mādhyamika philosophy as “The Buddhist Philosophy of Science,” Du Pré returns to the subject of “Buddhism and Psychology,” with a challenging statement:

“Textbooks tell us that scientific psychology was founded by Wilhelm Wundt in the latter half of the nineteenth century in Germany. However, they are wrong! It was founded two thousand five hundred years earlier, in India, by Prince Siddhārtha, the Buddha.” (p. 111)

Again, he proceeds to find parallels between Buddhism and Psychology:

- a) “Both Prince Siddhārtha and Wundt discarded the soul and the soul-like mind, and replaced it by **experience and matter**. Prince Siddhārtha repeatedly asserted that nowhere in the

Skandhas, his theory of psychology, is there a separate and abiding soul – an attitude enshrined in his fundamental doctrine of Anattā or No Soul. Instead, the Skandhas are clearly divided into *Rūpa*, which means matter, and *Nāma*, which means experience.” (p. 112)

- b) “All Buddhist schools, like all Western schools of psychology, accept that experience depends in the first place upon the contact of material sense objects or stimuli with material sense receptors, and the Pāli Abhidhamma also accepts a material base for experience somewhere inside the body. Also, both Buddhist and Western psychology use an atomic theory of matter.” (p. 113)
- c) “In the Buddhist psychology, as in more recent Western schools, the self or ego is seen as simply the learned notion of oneself as a person (*puggala*). Thus ‘I’ and ‘me’ are accepted as convenient and conventional terms used in everyday speech and life. But this ‘I’ is only one notion among many and does not actually organize experience. The Buddhist view, which is supported by modern brain research, is that each aspect of experience organizes itself and full experience at any given moment is simply the sum total of all these aspects added together. This is why the Buddhist theory of experiential factors is called the ‘*Skandhas*’, or ‘Groups’, ‘Heaps’ or ‘Aggregates’.” (p. 114)

Du Pré, nevertheless, recognizes that Western psychology had developed “a unique scientific innovation” as regards the experimental method, which resolves speculation. He says,

“I believe that to apply experimental findings to the Buddhist psychology also would have a most beneficial effect. It would resolve many philosophical disputes, as between the Early Buddhist and Mahāyāna Schools. It would restore to Buddhist psychological theory its original unity, showing that apparent differences between schools are nearly always only differences in emphasis. And it would make the Buddhist psychology a living and dynamic science once again, part of the mainstream of scientific thought.” (p. 115)

In the following article, Du Pré elaborates the concept of the Skandhas to which he made a reference in his discussion on Psychology. From these he proceeds to discuss “Science and the Wheel of Life,” and “Science and the Way to Nirvāṇa” and concludes the series with the article entitled “Scientific Buddhism.” It is his view that Western Science will unite with Buddhism to create a new religion:

“Many people believe that there must eventually arise a specifically Western form of Buddhism suitable to Western needs. In my opinion, this Western branch of Buddhism will be Scientific Buddhism. I hope this series of articles has gone some way towards laying the foundation for this school and that people who share my hopes for it will unite to make it grow and flourish.” (p. 153)

What we see from Buddhadasa P. Kirthisinghe’s compilation of writings as current in early 1980s is that the investigation which we traced to Colonel Henry S. Olcott’s pioneering attempt exactly a century ago had not only continued unabated but had also developed substantially in complexity and sophistication. Still, however, the investigations were not altogether objective. They seem to have had a compelling tendency to assume *ab initio* a great deal of compatibility between Buddhism and Science. They not only believed that Buddhism on the whole was science-friendly, but also appeared to be deeply convinced that Buddhism agreed with modern science in broad principles if not in detailed concepts. So far it has been an investigation only to establish – rather than critically evaluate – the favourable impression which Buddhists and friends of Buddhism held of the Buddha and his teachings.

**“TOWARD SUSTAINABLE SCIENCE –
A BUDDHIST LOOK AT TRENDS IN SCIENTIFIC DEVELOPMENT”
BY VENERABLE P.A. PAYUTTO
(DHAMMAPITAKA) 1993**

Venerable P.A. Payutto (Dhammapitaka), whose writings in support of Buddhist economics as enunciated by Schumacher in his “Small is Beautiful” are widely known and appreciated, dealt with the above theme at a presentation to the Faculty of Science of Chiang Mai University in August 1991. Published in Thai in 1992, it was translated by Bruce Evans and published in book form in 1993 (Available on-line in www.geocities.com/athens/academy/9280/science.htm.) It was immediately recognized as a stimulating contribution to the on-going investigation of Buddhism and Science.

Ven. Payutto began his analysis with a plea to scientists, many of whom, he felt, had deluded themselves “into believing that they have penetrated reality and conquered nature.” He says,

“In the context of a holistic understanding of the natural order, the human position within it, and the development of a beneficial human society, the extremely detailed knowledge of specialization has in effect led nowhere, and human beings are still very much in the dark. Science, as the major actor in this scenario, the leader of the quest for knowledge and specialization, is in a most opportune position to help the world

in this regard, by integrating its research and knowledge with other fields of learning in order to arrive at a more holistic understanding of the natural order.” (Introduction)

Immediately he clarifies the position, that Buddhism adopts towards Science:

“It is worth mentioning here that Buddhism has never seen science as an antagonist. **Buddhism welcomes scientific knowledge, recognizing it as another branch of learning about the natural order. Many Buddhists are in fact hopeful that the truths unearthed by science will serve to support and verify the timeless teachings given by the Buddha** thousands of years ago. At the very least scientific knowledge may reveal the truths of the physical world, which can only help to improve our understanding of life and mankind's place in the natural order, especially when such knowledge is incorporated with knowledge about the mental world or human world as explained through the teachings of Buddhism.” (Ibid-emphasis mine)

Venerable Payutto approaches the issue from an ethical standpoint, with sustainability of life on planet earth and fair distribution of its resources to humanity as a whole, as the primary concern. His attention is thus directed to the role, that science and technology currently play in development. His approach is to strike a balance sheet between advantages and the corresponding price in human terms. Thus in his first chapter on “Science and Technology,” he is conscious of not only the advances but also the negative effects:

“But on the other hand, when we really look into it, we find that science, and in particular technology, has created great many problems for humanity as well. In the present time, particularly in the highly developed countries, there is even a fear that the human race, and indeed the whole world, may meet destruction at the hands of this technological progress. It might be a very instantaneous kind of destruction, at the flick of a switch, so to speak, or it could be a slow and gradual kind of destruction, as the gradual deterioration of the environment.” (Chapter 1)

He argues further:

“If we ignore morality or ethics, instead of creating benefit, the most likely result is that science and technology will bring problems,

- 1) stressing, as they do, the unrestrained production and consumption of goods with which to gratify the senses, feeding craving and greed (*rāga* and *lobha*);
- 2) escalation of the power to destroy (*dosa*); and

3) increased availability of objects which lure people into delusion and carelessness (*moha*).

In so doing, technology tarnishes the quality of life and pollutes the environment. Only true moral awareness can alleviate these destructive influences.” (Chapter 1)

He questions the prevailing concepts of development, which he summarizes as:

1. That the prosperity of mankind hinges on the subjugation of nature.
2. That well-being depends on an abundance of material growth.

The chapter ends with a critique of the two major trends in current practice:

- “Specialization: The Industrial Age is the age of specialization. Learning has been subdivided into specialized fields, each of which may be very proficient in its respective right, but on an overall level they lack integration.
- The belief that ethical problems can be solved without the need for ethics.
- Supporters of this idea believe that when material development has reached its peak, all ethical problems will disappear of their own accord.” (Chapter 1)

Ven. Payutto proceeds to discuss the general issues pertaining to Religion and Science. His view is that Religion and Science share a common beginning in humankind’s fear of danger, particularly from natural forces. He sees science developing when some of the people arrived at different answers through observation and experiment. He states,

“Here religion and science diverge. One answer serves as a remedy for an immediate need, for the masses, and, relying heavily on faith and belief, lacks systematic observation. This is religion. Religion, then, is tied to faith. Science, on the other hand, is a discipline of gradual and systematic investigation. It is not concerned with finding immediate answers, and is available only to the few who are so inclined, not the whole of society. The systematic observation of natural facts has been carried on through the ages by interested parties, and the resulting institution has become known as ‘Science.’”(Chapter 2)

Bringing philosophy, too, for comparison, he defines the three disciplines as follows:

1. “**Science** is still in the process of verification and observation and is yet to come up with an answer.
2. **Philosophy** attempts to give an answer pending verification by using reasoned analysis.

3. **Religion:** provides an absolute answer which needs no verification.” (Chapter 2)

He contrasts Buddhism from other religions:

“The natural religions, Buddhism in particular, have a special interest in the human condition, but they do not see the source of problems entirely in the external world. **Buddhism looks for the source of problems within the entire process of causes and conditions -- including those within the human being, such as wrong ways of thinking -- be they internal or external, material or immaterial, physical or mental.**” (Chapter 2-emphasis mine)

Venerable Payutto has marshaled abundant evidence to establish the inadequacies of Science and debunked the total reliability on experiment and observation. One would have expected a similar examination of Religion. In spite of this gap, his conclusion is more an expression of hope:

“When science is finally able to arrive at the truth, to answer mankind's ultimate questions, it will be perfected. Many religions will no longer be sustainable. Conversely, a religion, which points to the highest truth, to reality, will be in a position to unify with science. **At that time science and religion will have reached another meeting point, their last one, where religion becomes science and science becomes religion, the division between the two gone forever.**” (Chapter 2-emphasis mine)

His rationale for hope is stated in following terms:

“On the brighter side, people seem to be getting over their excitement about science and are beginning to look at their needs in relation to religion. Many religions are addressing these needs on different levels. At the same time, **some members of scientific circles are becoming aware of the limitations of orthodox science, and are expanding the horizons of their research to include more religious perspectives, which suggests the possibility of a fully-developed science merging with a fully-developed religion, together to lead humanity to reality, peace, and a life free of foolish attachments.**” (Chapter2-emphasis mine)

The chapter which is directly relevant to the investigation under review is entitled “**Science and Buddhism: A meeting or a Parting?**” He begins by noting a major point of divergence between Buddhism and other religions. He contends that Buddhism arose from the fear of suffering whereas others owe their origin to the fear of danger. He argues,

“In the religious quest for protection from danger, people saw that in human society events were caused by human agents. They thought that there must be someone directing things in the natural world also, and so religions proposed God, a "someone," a supernatural source for all natural events. Applying the human social model to the forces behind nature, they came up with God. This is why some contemporary psychologists, reversing a well-known Christian teaching, have said that mankind created God in his own image. Mankind reasoned that it was necessary to appease the God, just as for an earthly leader, and this gave rise to various techniques and ceremonies for paying homage to the deity.

- The essential factor in determining events in the world, according to these ancient religions, was the will of God.
- The factor, which tied humanity to God or the supernatural, was faith.
- That faith was demonstrated through sacrifices, prayers, and ceremonies.

So we have an overall picture here of a director of events -- the will of God; we have the human connection -- faith; and we have the method of interaction -- sacrifices, prayers and ceremonies. This is the general picture of the role of faith in most religions.” (Chapter3)

He sees three significant points of difference:

“Theistic religions concern themselves with the source of danger, which is said to be God (or divine), but Buddhism concerns itself with the source of suffering, which is said to be ignorance.

The tie to this source in theistic religions is faith, but in Buddhism it is wisdom.

The director of results in theistic religions is a divine or supernatural power, but in Buddhism this responsibility has been placed back into human hands, with the emphasis on human action.” (Chapter 3)

What follows is a concise description of the basic characteristics of Buddhism, which he calls a “natural religion” in which nature is understood through wisdom. Being a Thai prelate, he confines himself to the teachings of the Buddha as preserved in the Pāli Canon. These have been selected to suit his objective of seeing “how they relate to Science.” They are grouped under six categories:

1. Adherence to the Law of Nature – *Anicca, Dukkha* and *Anattā*.
2. The Interrelation and Interdependence of all things: Dependent Origination - Cause and Effect.
3. The Position of faith - *Kālāma Sutta*.
4. Proclamation of mankind’s independence.

5. Remedy based on practical and reasoned action rather than dependence on external forces – Triple Gem, Four Noble Truths – Problem-solving.
6. Teaching only these truths which are of benefit - pragmatism in choice of issues.

To this he adds a discussion on good and evil and the five kinds of *niyamas* or natural laws. Similarly analyzed is the Law of Kamma, which he terms “Scientific Morality.” The chapter closes with a brief reference to free will, which ends with the observation:

“Buddhism doesn't stop simply at free will, but strives to the stage of being "free of will," transcending the power of will, which can only be achieved through the complete development of human potential through wisdom.” (Chapter 3)

It is in the next chapter titled “**The Role of Faith in Science and Buddhism**,” that Venerable Payutto takes a critical look at the compatibility or otherwise between the two disciplines. In continuation of his customary approach of identifying opposites, he talks of two kinds of faith:

1. Faith that obstructs wisdom
2. Faith that is a channel for wisdom,

Applying this distinction to Buddhism, he says,

“The faith that functions in Buddhism is the faith which leads to wisdom, and as such is secondary to wisdom. Buddhism is a religion free of dogma. The second kind of faith is found in both Buddhism and science. It has three important functions in relation to wisdom:

1. It gives rise to interest and is the incentive to begin learning.
2. It provides the energy needed in the pursuit of that learning.
3. It gives direction or focus to that energy.

Apart from these main functions, well-directed faith has a number of further characteristics, which can be shown in the Buddhist system of practice. The goal of Buddhism is liberation, transcendence, or freedom. Buddhism wants human beings to be free, to transcend defilements and suffering. This freedom must be attained through wisdom, understanding of the truth, or the law of nature.” (Chapter 4)

The detailed discussion, which follows, though profoundly more sophisticated than that of Paul Dahlke, leads to almost the same conclusion – namely Buddhism

is superior to science. In Venerable Payutto's words the comparison proceeds as follows:

“In Buddhism the search for truth is conducted in conjunction with training to develop human potential. The development of human potential is what determines the way knowledge is used, thus the probability of using knowledge to serve the destructive influences of greed, hatred and delusion is minimized. Instead, knowledge is used in a constructive way.

As for science, a one-sided faith in the laws of nature is liable to cause the search for knowledge to be unfocused and misdirected. There is no development of the human being, and there is no guarantee that the knowledge gained will be used in ways that are beneficial. **Science's search for the truths of nature does not, therefore, help anybody, even the scientists, to attain contentment, to relieve suffering, to ease tension or to have calmer and clearer minds.** Moreover, science opens wide the way for undesirable values to subvert scientific development, leading it in the direction of greed, aversion and delusion. **Thus, the drives to subjugate nature and to achieve material wealth, which have guided scientific development over the last century or more, have caused exploitation and destruction of the environment. If this trend continues, scientific development will be unsustainable.”** (Chapter 4 – emphasis mine)

He reiterates his conclusion in summary,

“In summary, we have been looking at two levels of values: the highest value and those intermediate values which are compatible with it. The highest value is a truth, which must be attained to; it cannot be artificially set up in the mind. Scientists already have faith in nature. Such conviction or faith is a value that is within them from the outset, but this faith must be expanded on to include the human being, which necessarily entails faith in the highest good, simply by bearing in mind that the laws of nature are connected to the highest good.”(Chapter 4)

He laments that

“Science is not interested in, and in fact ignores, human nature, and as a result has become an instrument of industry and its selfish advances on the environment.” (Chapter 4)

The rest of Chapter 4 and the concluding chapters contain a detailed discussion on how the perceived deficiencies of Science could be remedied

through Buddhism. In this respect, Venerable Payutto's position is that Buddhism has remedies as to how Science as currently developed and utilized could be transformed to serve humanity better to achieve the goal of "transcendence of suffering, freedom and the highest good." (Chapter 4) He says,

"Having looked at the aim of enquiry, let us now consider the means or methods for attaining that aim. In Buddhism, the method is threefold.

1. *Impartial awareness of sense data*, awareness of things as they are.
2. *Ordered or systematic thinking*.
3. *Verification through direct experience*." (Chapter 4)

He brings in the Buddhist concept of Right View, which in relation to Science involves

- a) Searching for causes and conditions
- b) Thinking by way of analysis
- c) Thinking in terms of benefit and harm.

What he hopes to achieve is stated as follows:

"If it were possible to incorporate the respective fields of expertise of both science and Buddhism, to bring the fruits of their labors together, we might arrive at a balanced way for leading human development to a higher level." (Chapter 4)

Very interestingly, Venerable Payutto seems to come to the same conclusion as Paul Dahlke: namely, the emphasis laid in Buddhism to mind and thought and the contribution which thought-process makes to Science. He says,

"Now this sixth sense, the mind, is also very important in science. The scientific method, from the very beginnings right up to and including experimentation and conclusion, has developed through this sixth sense. Before any other senses can be used, the scientist must utilize thinking. He must organize a plan, a method of verification, and he must establish an hypothesis. All of these activities are mental processes, which are dependent on the sixth sense, the mind. Even in practical application, the mind must be following events, taking notes. Moreover, the mind is the arbitrator, the judge of whether or not to accept the data that arise during the experiment." (Chapter 4)

Accordingly, the next chapter is entitled "**Approaching the Frontiers of Mind**." With a discussion on mind and matter he shows that –

“In short, we can say that the nature of reality on the fundamental level is still beyond the scope of scientific research. Some scientists even say that there is no way that science will ever directly know the fundamental nature of reality.” (Chapter 5)

He continues,

“Nowadays, leaders in the field of science seem to be divided into four main approaches to the nature of reality.

The first approach is that of the orthodox or conservative scientists. They stand by their conviction that science can eventually answer all questions, and that only through science can reality be understood.

The second approach is that of a group of "new" scientists, who concede that science is not able to explain the reality of the mind. They feel that science doesn't need to become involved and are willing to leave research into the mind to other fields, such as religion.

The third approach is that of a group of new physicists who believe that the Eastern religions can help to explain the nature of reality. They believe that the way for future of scientific research is pointed out in Eastern religions. The most well-known of these is Fritjof Capra, author of *The Tao of Physics* and *The Turning Point*.

The fourth approach is that of another group of new physicists, who maintain that the material world is one level of reality contained within the realm of the mind. This is the model I mentioned earlier, of the large ring with the smaller ring inside it.” (Chapter 5)

Venerable Payutto proceeds to deal with ethical issues, examines such statements of Albert Einstein on “serious scientific workers as the only profoundly religious people” and “Buddhism as having a high degree of cosmic religious feeling” and concentrates on the effect of values and ethical concerns on scientific research. Seeing Science as a “lackey of industry,” he asks himself the question:

Will science recognize the sixth sense and the data, which are experienced there? Or will scientists continue to try to verify moods and thoughts by looking at the chemicals secreted by the brain, or measuring the brain's waves on a machine, and thereby looking at mere shadows of the truth?" (Chapter 5)

To this question, Venerable Payutto's response is the following

“If this is the case, science may have to take a look at some of the ways of observing and experimenting used in other traditions, such as Buddhism, which maintains that observation and experiment from direct experience in the mind the best way to observe the laws of nature.” (Chapter 5)

The concluding chapter on “**Future Directions**” argues that too little is being done and that also too late to transform Science and the attitude of scientists. He highlights three values, which “scientists will inevitably have to deal with.” Namely,

1. “Mundane values, which scientists, as ordinary people, have in common with everybody else. This includes incentives or motivations, both good and bad, occurring in everyday life, and also in the search for and use of knowledge. Such values include selfishness, the desire for wealth, gains, fame or eminence, or, on the other hand, altruistic values, such as kindness and compassion.
2. Values which are adhered to as principles, and which guide the direction of learning, such as the idea of subjugating nature, the values of the industrial age, the belief that happiness can be obtained through a wealth of material goods, or conversely, the principle of addressing problems and improving the quality of life.
3. The highest value, which scientists should adhere to as members of the human race, is the ideal of the human race as a whole, which, as I have said, has so far been neglected by the world of science. Science is still only half way, with an aspiration to know the truths of nature solely on an outward level. Such an aspiration does not include the matter of "being human," or the highest good. **Science has still some unfinished business to do in regard to these three values.**” (Chapter 6 – emphasis mine)

There is no doubt that Venerable Payutto has proposed a significant change of direction in the century-long investigation of Buddhism and Science. His is a legitimate position for a Buddhist prelate to stress on the ethical values of Buddhism and recommend them for adoption in the scientific exploration of the laws of nature. But a question needs to be raised: What will motivate the modern scientist to adopt the kind of approach to research and use of research findings, which he proposes. It is easy to criticize science as a lackey of industry. But beyond the incentives that economic advantages of marketable new products whether it be in food and drugs, appliances and mechanical equipment etc., what exists as the provider of resources for scientific research and development? Will scientific and technological development be promoted to serve the many needs and challenges of modern life if research was confined to pure or fundamental sciences? It has to be noted that Venerable Payutto's rather narrow view of

science which ignores what science has to contribute to human progress through advances in agriculture, medicine, communication, transport and overall human well-being detracts from the efficacy of his suggested remedies.

**“BUDDHISM AND SCIENCE:
BREAKING NEW GROUND”
BY B. ALAN WALLACE (EDITOR), 2003**

This 444-page volume, published by the Columbia University Press, New York, in 2003 in the Columbia Series in Science and Religion, is totally different from the works discussed hitherto. The research culminating in this publication commenced in 1987 with inspiration and encouragement of His Holiness the Fourteenth Dalai Lama, Tenzin Gyatso. Produced by a team of highly trained professionals with widely recognized credentials as specialists in Buddhism, Philosophy or Science, the level of academic objectivity aimed at and maintained is remarkable. The writers for the most part are truly dedicated to the search for the truth with no partiality as to what conclusions their research led them to, even though they are mainly steeped in Tibetan or Mahayana traditions of Buddhism with a *penchant* toward Madhyamika philosophy. Following the overall introduction by Alan Wallace, the book is divided into three parts:

Part I – Historical Context

Part II – Buddhism and the Cognitive Sciences

Part III – Buddhism and the Physical Sciences

The purpose for which the book is intended is multiple. In the words of Alan Wallace,

“I believe that this anthology of essays will be of interest not only to Western scientists, Buddhologists, and scholars of religion but also to a much broader range of readers interested in East-West dialog and the interface between science and religion as a whole. It is our hope that this work will illuminate multiple ways of exploring the nature of human identity, the mind, and the universe at large and thereby lead to greater well-being for all humanity.” (p. xvi preface)

Alan Wallace’s introduction deals in depth with a series of issues: e.g. Breaking down the barriers between religion and science in general and between Buddhism and Science in particular; whether Buddhism is simply a religion; empirical science and the dogma of scientific materialism (with special reference to objectivism, reductionism, monism, physicalism and the closure principle); the religious status of scientific materialism, and the dogma of postmodernism. It concludes with his approach to a way of dialogue and collaboration:

“The way forward, I would argue, is through mutuality, respectful dialogue, and collaboration in both empirical and theoretical research. This entails reaching out across disciplines and cultures to increase mutual understanding of areas of common interests. In terms of the interface between Buddhism and science, we must be self-conscious of the assumptions we bring to Buddhist studies, while entertaining the possibility of learning about the world *from* Buddhism, as opposed to studying this tradition merely as a means to learn *about* Buddhism. **The aspects of Buddhism that are most inviting for such interdisciplinary inquiry are those that are accessible to empirical and analytical inquiry. Moreover, such research will take fully into account the experiences of Buddhist practitioners, of the present and past, and not focus on texts alone.** In this way Buddhism may be viewed as a form of ‘natural philosophy’ (the label for early European science), challenging us to ask the deepest possible questions (as in religion) by means of rigorous logical analysis (as in philosophy) and empirical investigation (as in science). **This way of grappling with Buddhist truth claims seeks not only an objective appraisal of the textual *doctrines* of Buddhism but also its claims of experiential *insights*. And the objective appraisal of the latter may require testing these assertions by engaging in the Buddhist practices oneself, just as one might test a scientific theory by running experiments oneself.**” (pp. 26-27 emphasis mine)

Of the two essays on the historical context, that of Jose Ignacio Cabezon discusses the nature of the dialogue between Buddhism and Science and analyzes the progress of what I call a century of investigation from its inception “when Buddhism was cast not as a partner of science in a dialogue but rather in a rhetoric that cast Buddhism as the subject matter of scientific inquiry.” (p.36) He identifies and critically examines the “naïve and unsophisticated” views expressed by overly enthusiastic Buddhist writers (cf. pp. 43-54) and traces how the current interaction “evokes a specific kind of complementarity.” (p.52). It is also his view that

“The dialogue between Buddhism and physics is by no means in its infancy, but it cannot compare to the state of the dialogue between Buddhism and the mind sciences.” (p.52)

Thupten Jinpa complements Cabezon’s essay by detailing the Tibetan Buddhist masters’ encounter with modern science. Posing to himself the question whether Science is an ally or a rival of Buddhism, the discussion leads to the conclusion that science is not only an ally but also an equal partner of Science.

Part 2 of the book on “Buddhism and the Cognitive Sciences” starts with an essay by His Holiness the Fourteenth Dalai Lama on “**Understanding and Transforming the Mind.**” He states,

“I regard all the major world religions, especially Buddhism, as instruments, or methods, for training the mind, for overcoming problems, primarily of the mind, specifically negative forces in our emotions that create mental unrest, unhappiness, fear, and frustration. Such mental states result in various negative activities that bring more problems and suffering. *Dharma* means an approach for overcoming these long-term problems, so it has the connotation of protecting, or saving, one from unwanted things. Therefore, Buddhadharma is a system of transforming, or disciplining, the mind to bring about inner tranquility.” (P. 97)

Linking Buddhism with Science from this perspective, His Holiness concludes,

“From this perspective, Buddhism presents itself as an exploration and resultant presentation of the nature of objective reality. In the course of such exploration, it is strongly emphasized that one must have an impartial, objective attitude. In the course of scientific exploration and research one must also be objective, not allowing one’s work to be prejudiced by one’s own beliefs and preferences. One’s research must be guided by the empirical findings themselves. The same is true in Buddhism: one must be objective, identifying the extent of one’s preconceptions and recognizing how they can get in the way. **It is important to discover the actual nature of reality apart from one’s preconceptions and conduct research with this goal in mind. In this way science and Buddhism are quite similar.**” (p. 102 emphasis mine)

In David Galin’s analysis of “The concepts of ‘Self’, ‘Person’, and ‘I’ in Western Psychology and in Buddhism,” he, at the very outset, declares modestly

–

“I will sketch my understanding of the generic Buddhist view for those with little familiarity with Buddhism, drawing heavily on Collins (1982), Garfield (1995), Hopkins (1983-1987), and Wallace (1989-1998). In the Buddhist ‘correct view’ the self is seen not as an entity, or as a substance, or as an essence but as a dynamic process, a shifting web of relations among evanescent aspects of the person such as perceptions, ideas, and desires. The self is only *misperceived* as a fixed entity because of the distortions of the human point of view. Ultimately, no separation is to be found between these dynamic processes and the universal

frame of reference or ground of being; all is interdependent and changing. Thus, in this sense, there is no Self separable from a Nonself. The Buddhist declaration is misunderstood in the West because anātman meaning ‘**self-is-not-an-essence-or-entity**,’ is taken as ‘**self-does-not-exist-at-all**’ by people who have not imagined any scheme of existence other than entities or essences.” (p. 108 – emphasis mine)

His is a studious search for points of contact between Buddhist concepts and contemporary psychology. He concludes with the statement:

“The doctrine of no-self, anātman, is often misunderstood as yet another example of Buddhism’s alleged pessimism and nihilism. On the contrary, the Buddhist solution to the modern suffering of alienation and anomie is to completely contextualize self, not to simply erase it. This seems to be remarkably consonant with trends toward holism in Western thought that go beyond psychology. The West’s new appreciation of context is shown by mounting interest in ecology, in sustainable practices in relation to the natural environment. There is a broadening emphasis on understanding the relation of the part to the whole that seems to me all of a piece with efforts more conventionally identified as psychological or spiritual work.” (p137)

The meticulously annotated article of William S. Waldron sees “**Common Ground and Common Cause in Buddhism and Science as regards afflictions of Identity**”. Commencing with the Buddha’s assertion that “all sentient beings are deranged” (*Sabhe sattā unmattakā*) and the Buddhist view that “confusion about the nature of the self is deeply related to the origins of evil and human-inflected suffering,” (p. 141) he has embarked on a comparative study of Buddhism, and the cognitive, biological, and social sciences. With data assembled from many sources, he states,

“We have finally reached the bloody irony of our modern era. Our attempts to turn reality on its head results in ‘*the paradox...that evil comes from man’s urge to heroic victory over evil*’ (Becker 1975:136), from our ill-chosen means of constructing sacred identities whose very existence requires that we continuously create and vanquish opposing ‘evil’ entities in the world. Human beings make war and kill each other in a way that no other animal species does because no other species is dependent upon sacralizing symbols of consensual reality in order to make sense of their lives. No other species has the capacity, or the need, to externalize identity out into the wide-open world where its fate, our fate, blows so helplessly in the wind.” (p. 168)

and continues,

“In the aggregate these observations from the biological and social sciences not only resonate with but resound classical Buddhist notions of the construction of identity as the locus of self-grasping and ignorance in the face of the radical impermanence and interrelatedness of all phenomena. These ideas have provided a comprehensive framework from which we may make some sense of the massive perpetration of evil and suffering we inflict on each other each and every day. We can see how the interdependent nature of phenomena, the fabrication of identity, and attachment to our selves at the expense of others all function equally effectively, and nefariously.” (p. 168)

In keeping with the general trend in the essays in this volume, Waldron, too, looks at what the new knowledge and understanding could contribute:

“Such understanding, however, needs to issue in action. This is no easy task, nor is it to suggest that the Buddhists or anyone else have a single panacea for all that ails our world. Buddhists traditionally say that the Buddha taught eighty-four thousand practices directed toward alleviating eighty-four thousand kinds of afflictions. This traditional stock figure expresses the necessity, one could say, of understanding all the particulars our complex world in order to address its multifarious ills.” (p.170)

The articles by Francisco J. Varela and Natalie Depraz on “Imaginations: Embodiment, Phenomenology and Transformation,” by Stephen LaBerge on “Lucid Dreaming and the Yoga of the Dream State – A Psycho-Physiological Perspective” and by Matthieu Ricard “On the Relevance of a Contemplative Science” continue the search for contact points between Buddhism and such mind sciences as psychology and neuroscience. Issues addressed in these essays include “origin of consciousness, free will, the relation between mental afflictions and genuine happiness and the false dichotomy of reified concepts of mind and matter.” (p. 259)

Thus the six essays of this Part of Alan Wallace’s anthology devoted to Buddhism and Cognitive Sciences make an extraordinarily informative contribution to our knowledge of the subject. Though clarity is sometimes sacrificed in favor of academic caution, the essays are invaluable as they are not only purely objective analyses of observed data but also in-depth examinations of personal experience in meditation and contemplation. Especially in dealing with direct experience, which the writers had with practitioners and teachers of Tibetan Buddhism, the insights recorded by them become extremely relevant and useful.

The third Part of the Book Consists of six articles on Buddhism and Physical Sciences. William Ames, with a MS in Physics and a Ph.D. in Religious Studies, writes on Emptiness and Quantum Theory. Starting with introductory remarks on “Some basic Buddhism,” “Abhidharma” and “Classical Physics,” he observes,

“Despite some significant differences, Abhidharma and classical physics can be seen as broadly similar. Both reduce the world to impersonal, relatively simple units of analysis, which are causally related to each other. Whether the units of analysis are particles and force on the one hand, or dharmas on the other, physical objects and living organisms are seen as just complicated combinations of these simple units. In classical physics particles and forces are related by physical laws, which are usually expressed in equations. In Abhidharma dharmas are related by the various kinds of causes and conditions summed up under the heading of dependent origination.” (p. 292)

Ames proceeds to discuss how the difficulty experienced by classical physics in accounting for some phenomena led Albert Einstein to develop his special and general theories of relativity and Niels Bohr and Werner Heisenberg their quantum theory. As salient features of quantum theory, he includes,

“quantization, wave particle duality, complementarity, uncertainty or indeterminacy, probabilistic prediction, the quantum measurement problem, and nonlocality.” (p. 293)

The aspect of Buddhism, which Ames has chosen for comparison with quantum theory is the Madhayamaka philosophy with its singular emphasis on Sunyata or Emptiness – a character associated with anything which has no intrinsic nature of its own and is contingent and dependent on others. He identifies two factors as points of similarity:

-- An electron’s dependence not only on the electron but also the kind of experiment that is conducted;

-- “participatory universe” – explained as follows:

“Whether an electron behaves as a wave or a particle depends on the type of experiment being done and it is the observer who decides what sort of experiment to do An observer does not record an objectively existing electron. Instead he or she is partially responsible for determining what the electron is.” (p. 301)

As regards the second factor, his position is that Madhyamaka has its own version of “participatory universe.”

“In line with the general principle of dependent origination, subject and object, knower and the known, observer and observed exist only in relation to each other. Neither has an independent ‘objective’ existence. They are all empty of any self-contained intrinsic nature.” (p. 301)

Victor Mansfield, in a rambling essay with the title “Time and Impermanence in Middle Way Buddhism and Modern Physics,” elaborates his personal experience in trying to grow his own carrots to enjoy better-tasting juice. He concludes with a mathematically and graphically enriched analysis of time in physics with a section on “Comparisons and Connections,” which comes out as a rather discursive contemplative exercise leading to such conclusions as the following:

“I suggest that the principle of emptiness, if more fully appreciated within science, could actually further the scientific enterprise.”

“Science is clearly a cultural dominant is the West. Therefore, if Buddhism is to come to the West, in the best and the fullest sense of the term, then interaction with science is both inevitable and necessary for a real transplant to take place.” (p. 317)

The next two articles by Michel Birbel and David Ritz Fincklestein continue with the discussion of concepts of the Madhamaka philosophy in greater detail and with special reference to Western philosophy. Anton Zeilinger’s report elaborates “Encounters between Buddhist and Quantum Epistemologists” in which His Holiness the Dalai Lama carries on a stimulating conversation with a multidisciplinary group of reputed intellectuals. The volume ends with a concluding essay by Piet Hut highlighting the main conclusions of the research and proposing life as a laboratory for the continuing investigation of issues relating to Buddhism and Science. There is no doubt that this book edited by Alan Wallace is by far the most detailed and diverse discussion on the subject and its contribution to the on-going investigation is immense.

PADMAL DE SILVA ON BUDDHISM AND PSYCHOTHERAPY – HSI LAI JOURNAL OF HUMANISTIC BUDDHISM 1999-2006

Padmal De Silva, a practicing and teaching clinical psychologist from the Institute of Psychiatry of the University of London, England has looked for parallels in behavioral modification and therapeutic strategies in Buddhism and Western Psychotherapy. Findings of his research are published in the following articles diffused primarily by the International Academy of Buddhism of the University of the West:

- 1) Buddhism and behavior modification. *Behavior Research and Therapy*, 1984, p.p. 22, 661-678.
- 2) Self-control strategies in Early Buddhism. In J. Crook & D.Fontana (Eds.) *Space in mind: East West psychology and contemporary Buddhism*. Shaftesbury: Element Press
- 3) Buddhist Psychology: Theory and Therapy, In M.G.T. Kwee & T.L. Holdstock (Eds.) *Western and Buddhist Psychology*. Delft: Eburon Publishers.
- 4) Buddhism and Psychotherapy: The Role of Self-control Strategies, *Hsi Lai Journal of Humanistic Buddhism*, Volume I, 2000
- 5) Humanistic Buddhism and Mental Health: Therapy and Prevention, *Hsi Lai Journal of Humanistic Buddhism*, Volume 2, 2001
- 6) Universal Ethics for Psycho-somatic Well Being: The Role of Humanistic Buddhism, *Hsi Lai Journal of Humanistic Buddhism*, Volume 3, 2002
- 7) Obstacle to insight: Some reflections on an aspect of Buddhist psychology, *Constructivism in the Human Sciences*, 2003, p.p. 8, 173-180.
- 8) Social Well-Being through Mental Health, *Hsi Lai Journal of Humanistic Buddhism*, Volume 5, 2004
- 9) Nature, Nurture and Mental Culture, *Hsi Lai Journal of Humanistic Buddhism*, Volume 6, 2005
- 10) Traumatic Stress and Trauma Counseling: Some Post-Tsunami Reflections from a Buddhist Perspective, *Hsi Lai Journal of Humanistic Buddhism*, Volume 7, 2006

Padmal de Silva's studies on Buddhism and Behavior Modification date back to 1984. Presenting his results in December 1999 to the First International Conference of the International Academy of Buddhism in a paper entitled "Buddha and Psychotherapy – Role of Self-control Strategies," he stated

- Buddhism has a rich and highly sophisticated psychology.
- The practice of Buddhism as a religion and way of life involves much in terms of psychological change.
- The ultimate religious goal of the arahant state both reflects and requires major psychological changes.
- Buddhist psychology is relevant to mental health in today's world in two obvious ways. **First, it has techniques and strategies, which can be used for the remediation, or therapy, of disordered or maladaptive behaviour and emotions. In other words, it has much to offer for the treatment of psychological problems. Second, it has techniques, as well as an overall stance, that can help in the prophylaxis – i.e. prevention – of psychological disorders. Prevention of psychological disorders is acknowledged as a legitimate aim of psychotherapy.** In the sense that preventive work does not deal with existing aberrations, but enables a person to become less vulnerable to such aberrations and disorders, this can be seen as a

higher-order aim of psychotherapy. (Journal 2000, p.170 – emphasis mine)

With copious references to both research and clinical experience of Jon Kabat-Zinn, and his colleagues, de Silva demonstrates the role of Buddhist meditation in psychotherapy. He refers in particular to evidence from Pali canonical texts: e.g. pain control through mindful meditation (Samyutta V), and ensuring trouble-free sleep (Vinaya I). He proceeds to identify the development of loving kindness “as a remarkable psychological strategy, where the strength of one mental state is used to modify an opposite or antagonistic one”. From the Dhammapada commentary story of Kuddāla, he shows how stimulus control was made use of as it is in modern psychological treatment. Similarly he discusses the five techniques of intrusive cognition mentioned in the commentary on Vitakkasantāna sutta, namely:

1. switch to an opposite and incompatible thought;
2. ponder on harmful consequences;
3. ignore the cognition and distract oneself;
4. reflect on removal of causes; and,
5. control with forceful effort. (Journal 2000, p. 176)

He observes that “these strategies bear close similarity to techniques used in modern behavioral psychotherapy for the problem of intrusive cognition, especially obsessions” (p. 176). He adds,

“The Buddhist texts also offer suggestions as to what distractions might be usefully employed; these include both physical and cognitive ones. For instance, one might recall a passage one has learned, concentrate on actual concrete objects, or undertake an unrelated physical activity. The sixth technique (concentration on the unwelcome, intruding thought) is similar to the modern strategy of satiation/habituation training (e.g. de Silva & Rachman, 1998; Rachman & Hodgson, 1980). Present-day therapists may instruct the client to expose him/herself to the thought repeatedly and/or prolonged periods of time. The Buddhist texts advise one to face the unwanted thought directly and continuously, concentrating on that thought and nothing else.” (Ibid. P. 177)

A special feature in Buddhist psychotherapy which Padmal de Silva emphasizes is the attention given to prophylaxis (i.e. the prevention of certain kinds of psychological disorders). In this respect, he makes special reference to meditation in general and the practice of four Sublime States (Loving kindness, compassion, sympathetic joy and equanimity), in particular. His conclusion in the first article is striking:

“Thus Buddhism clearly has the ability to contribute to present day psychotherapy in a truly wide sense, transcending the divisions that exist between the various schools. For this reason, Buddhism is likely to exert a major and growing influence on the field of psychotherapy, both in its practical aspects and - even more - in its underlying philosophy.” (Ibid. p. 179)

Padmal de Silva elaborates his arguments with additional data in each of the following articles. He stresses that “Buddhism is interested in people’s day-to-day lives, their interactions with one another and their social institutions and practices” (Journal II p. 40) and attributes Buddhism’s strength and durability to this humanistic stance.

To establish that many of the Buddhist strategies are strikingly similar to present-day behavioral and cognitive therapy strategies, de Silva lists the following with convincing explanations:

- how King Pasenadi Kosala was treated by the Buddha for obsessive eating (Journal II pp 47-48)
- how in a Jataka a grieving father is made to realize the futility of grieving (Ibid. pp. 48-49)
- the story of the grieving mother Kisa Gotami who was sent on a search for a mustard seed from a home unvisited by death (Ibid. p.49)

He compares them to performance-based methods in modern psychotherapy in which. “the best way to modify an irrational belief is to arrange for the subject to undergo performance-based experiences, leading to repeated disconfirmation of the irrational beliefs.” (Ibid. P. 49). Re-emphasizing the prophylactic role of Buddhist ethics, he states

“Psychological well-being, in terms of the prevention of maladaptive reactions and of developing positive strengths, is a major goal of Buddhism. It is no exaggeration to say that Buddhist psychology is very much geared towards this aim.” (Ibid. P57)

A further area of study to which Padmal de Silva has drawn attention is the role of nature and nurture on human development and characteristics, as perceived by Western scientists and the elucidation, which the Buddha’s teachings and Buddhist practices offer to resolve the on-going controversy on the subject. Referring in particular to Buddhist practices pertaining to mental cultivation (e.g. meditation), he says

“There are numerous examples of mental exercises, or aspects of mental culture, explicitly recommended in Buddhist texts for the purpose of enhancing an ethically sound life. Controlling anger, controlling and eliminating unwholesome attachments,

combating slothfulness, reducing greed and gluttony, overcoming excessive grief reactions, are but some areas where such exercises in mental culture are recommended as a means. Some of these have already been discussed in the literature (e.g. de Silva, 1984; 2003). From this perspective, mental culture is a particularly crucial element in one's personal development.” (Journal VI p. 2005)

Padmal de Silva continues his study of the application of Buddhist strategies to psychotherapy in relation to actual field experience as illustrated by his writings on the experience of Sri Lankan victims of the 2004 Tsunami.

Though his studies are still of the explorative level, the information he has gathered and presented promise more extensive and in-depth analysis of what Buddhism is able to contribute to modern psychotherapy as well as psychology.

**JON KABAT-ZINN AND COLLEAGUES
ON BUDDHIST MINDFUL MEDITATION
IN THE TREATMENT OF DEPRESSION,
DEMENTIA AND STRESS REDUCTION**

Jon Kabat-Zinn Ph.D. in Molecular Biology, Professor Emeritus of Medicine of the University of Massachusetts Medical School, teaches and practices mindfulness meditation as a technique to reduce or eliminate pain, stress, anxiety and illness, besides conducting in-depth research and experimentation. He founded the Center for Mindfulness in Medicine, Health Care and Society at this University in 1979 and functioned as its Executive Director. His objective has been to bring “mindfulness into the mainstream of medicine and society.” He is also the founder of the Stress Reduction Clinic and his course on Mindfulness-based Stress Reduction (MBSR) is being used nationally and internationally in our 200 medical centers and clinics. Apart from hundreds of audio-visual materials he has developed and marketed, a significant body of literature has been produced on the subject by Kabat-Zinn and his many co-workers.

A prolific writer himself, his main works are

- Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain and Illness (Delta, 1991);
- Wherever you Go, There you Are: Meditation in Everyday Life (Hyperion 1994);
- (with Myla Kabat-Zimm) Everyday Blessings: The Inner Work of Mindful Parenting (Hyperion 1997); and
- Coming to Our Senses (Hyperion 2005).

The following are representative of the many papers he has published by himself or in collaboration with colleagues:

- Kabat-Zinn, J., An out-patient program in Behavioral Medicine for chronic pain patients based on the practice of mindfulness meditation: *General Hospital Psychiatry* (1982) 4:33-47.
- Kabat-Zinn, J., Lipworth, L. and Burney, R., The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine* (1985) 8:163-190.
- Kabat-Zinn, J., Lipworth, L., Burney, R. and Sellers, W., Four year follow-up of a meditation-based program for the self-regulation of chronic pain: Treatment outcomes and compliance. *Clin.J.Pain* (1986) 2:159-173.
- Kabat-Zinn, J. and Chapman-Waldrop, A., Compliance with an outpatient stress reduction program: rates and predictors of completion. *J.Behav. Med.* (1988) 11:333-352.
- Ockene, J., Sorensen, G., Kabat-Zinn, J., Ockene, I.S., and Donnelly, G., Benefits and costs of lifestyle change to reduce risk of chronic disease. *Preventive Medicine*, (1988) 17:224-234.
- Bernhard, J., Kristeller, J. and Kabat-Zinn, J., Effectiveness of relaxation and visualization techniques as an adjunct to phototherapy and photochemotherapy of psoriasis. *J.Am. Acad.Dermatol.* (1988) 19:572-73.
- Ockene, J.K., Ockene, I.S., Kabat-Zinn, J., Greene, H.L., and Frid, D. Teaching risk-factor counseling skills to medical students, house staff, and fellows. *Am. J. Prevent. Med.* (1990) 6 (#2): 35-42.
- Kabat-Zinn, J., Massion, A.O., Kristeller, J., Peterson, L.G., Fletcher, K., Pbert, L., Linderking, W., Santorelli, S.F., Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *Am. J Psychiatry* (1992) 149:936-943.
- Miller, J., Fletcher, K. and Kabat-Zinn, J., Three-year follow-up and clinical implications of a mindfulness-based stress reduction intervention in the treatment of anxiety disorders. *Gen. Hosp. Psychiatry* (1995) 17:192-200.
- Massion, A.O., Teas, J., Hebert, J.R., Wertheimer, M.D., and Kabat-Zinn, J. Meditation, melatonin, and breast/prostate cancer: Hypothesis and preliminary data. *Medical Hypotheses* (1995) 44:39-46.
- Kabat-Zinn, J. Chapman, A. and Salmon, P. The relationship of cognitive and somatic components of anxiety to patient preference for alternative relaxation techniques. *Mind/Body Medicine* (1997) 2:101-109.
- Saxe, G., Hebert, J., Carmody, J., Kabat-Zinn, J., Rosenzweig, P., Jarzobski, D., Reed, G., and Blute, R. Can Diet, in conjunction with Stress Reduction, Affect the Rate of Increase in Prostate-specific Antigen After Biochemical Recurrence of Prostate Cancer? *J. of Urology*, In Press, 2001. Wikipedia www.bookrags.com/wiki/Jon_Kabat-Zinn

The technique Kabat-Zinn uses is a combination of Buddhist *Ānāpānasati* or Mindfulness Meditation and Hindu Hatha Yoga. He also seems to draw on the Burmese technique of Body Scan as developed by U Ba Khin and popularized by S.N. Goenka through his *Vipassana Bhāvanā* movement. He is also well informed of Tibetan Buddhist techniques relevant to psychotherapy. He has been closely associated with His Holiness the Fourteenth Dalai Lama in organizing his dialogues with Western Scientists. Of very special interest in the application of Buddhist strategies to psychotherapy are his controlled experiments on the use of Mindfulness meditation to increase the interval before a patient has a relapse of depression. Of these experiments, Padmal de Silva observes,

“Some impressive research has also shown the usefulness of mindfulness meditation (a form of *vipassanā* meditation) training in the management of chronic pain (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth & Burney, 1985).” (Hsi Lai Journal of Humanistic Buddhism I p. 173)

“Kabat-Zinn *et al.* (1985) reported that ninety chronic patients who were trained in mindfulness meditation in a ten-week stress-reduction programme showed significant improvement in pain and related symptoms. This was in a stress reduction programme at the University of Massachusetts Medical Centre. A control group of patients who did not receive meditation training did not show such improvement.” (Ibid. p. 173)

“In present-day psychotherapy, mindfulness meditation has also been successfully used for the dermatological condition of psoriasis which is known to have a psychological contribution (e.g. Kabat-Zinn, Wheeler, Light, Skillings, Scharf, Cropley, Hosmer & Bernhard, 1998). It has also been used, in a well-controlled clinical trial, for anxiety (Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, Pbert, Linderkin & Santorelli, 1992). Even more important is a very recent development, involving well-established clinical psychologists in three centres - Cambridge in England, Bangor in Wales, and Toronto in Canada. The researchers, Teasdale, Williams and Segal, have been conducting a trial of mindfulness meditation to see whether this intervention will reduce the chances of relapse in patients who have recovered from depression. Those who recover from depression with treatment have a high probability of suffering further episodes of clinical depression, so reducing relapse rates is a challenge to the clinician. These researchers have compared a group of recovered depressives engaging in mindfulness practice, with a second group with no such intervention but receiving the usual psychiatric and medical follow-up. Up to now, data from 145 subjects have shown that mindfulness meditation does indeed lead to a reduction in relapse. This is a

major finding in the content of present day psychiatry and psychology. A theoretical discussion of the rationale behind this work is provided by John Teasdale (See Mindfulness-based Cognitive Therapy for Depression, Guilford Press, New York 2002).” (Ibid. p. 174-175)

The multidimensional experiments and research of Kabat-Zinn and his colleagues constitute the most convincing evidence, presented systematically to the scientific community, on how Buddhist techniques of meditation have been and can be utilized in modern psychotherapy.

**“ZEN AND THE BRAIN; TOWARD AN UNDERSTANDING OF
MEDITATION AND CONSCIOUSNESS” AND
“ZEN-BRAIN REFLECTIONS”
BY JAMES H. AUSTIN 1998 – 2006**

The impressive 900 page volume entitled “Zen and the Brain: Toward an Understanding of Meditation and Consciousness” (1998) and the equally substantial sequel “Zen-Brain Reflections”(2006) – both published by the prestigious MIT Press – are the results of a life-time of research and experimentation by James H. Austin, Clinical Professor of Neurology, University of Missouri Health Service Center, Emeritus Professor of Neurology, Colorado Health Science Center and active Zen practitioner. His area of interest has been the neurological workings of the human brain in relation to meditation. His attempt to establish links between neuroscience and Zen meditation has resulted in scientifically discovered and evaluated data.

These works have been described by fellow neurologists as “monumental masterpieces.” Richard J. Davidson, William James and Vilas Research Professor of Psychology and Psychiatry at the University of Wisconsin, Madison, calls his contribution to the emerging discipline of contemplative neuroscience as “a monumental melding of wisdom from Zen and other contemplative traditions with modern neuroscience.” George Adelman, Editor of The Encyclopedia of Neuroscience, explains, “By monumental I refer not merely to the size but also the breadth and depth of the coverage.” Austin is being especially commended for his analysis and convincing explanation of “the profound interrelationships between consciousness, the brain and the world.” (www.amazon.com/zen-brain-reflections-James-H-Austin/dp)

By using the tools of modern neuroscience to identify and measure the physiological change in the brain resulting from levels of consciousness attained through meditation – with specific reference to the traditional Zen meditative practices – James H. Austin has made an outstanding contribution to raising the level of sophistication and complexity of the investigation into Buddhism and Science. His pioneering role in this regard is extraordinary.

Illustrative of his findings are the following:

- “As the old millennium closes, the world is inching (a micron at a time) toward a behavioral neurology of religion, a topic slightly more valid and acceptable now than when William James first spoke about it nearly a century ago. Such a field of inquiry is an *experiential neurology* in one sense. At best, one of its branches might be rigorous enough to justify the term, *the meditative sciences* during the next century. The larger discipline of experiential neurology will abandon the house of the intellect. It will not ignore the firm rules of evidence, nor will it peddle snake-oil, and indulge in false doctrines. It will be correlating the findings from several different brain-mapping techniques. Its sophisticated neuroimaging methods will be focused on very special moments in the lives of many carefully-selected subjects, not from one person, as we have been obliged to do in this book.

An emerging discipline of experiential neurology will include within its broad scope such topics as meditation, preconscious functions, absorptions and insight-wisdom. Its mission will be to uncover the mechanisms by which each one transforms experience and behavior. The author welcomes correspondence that could help clarify any of these topics, for each is currently undervalued and woefully misunderstood.

Yet, within a few years after his “Decade of the Brain” is finished, one can foresee the vocabulary of this emerging field starting to become as familiar to our citizens as are now such words as cholesterol, DNA, and Alzheimer’s disease. For clarify how the human brain does transform itself, and function responsibly in the practical arts of everyday living.” (Zen and the Brain p. 697)

- “In this millennium, the scientific community has every reason to insist on rigorous selection of subjects, prior training in the laboratory, and an equally rigorous program of refined, accurate psychological accounting. One hopes that future comprehensive studies of (Zen and other) meditators will be conducted with standards of excellence in psychological correlations that aspire to approach the technological sophistication of the neuroimaging instrumentation. The four neuroimaging reports described above suggest two other caveats for future studies: (1) “meditation” evolves during the course of each standardized period. To study the whole dynamic longitudinal process in Zen will require more than a single 12- or 15-minute interval of one-dimensional neuroimaging data; (2) “meditation”

tends to evolve over much longer units of time in a graded manner. Indeed, the Path of Zen is a longitudinal process (see chapter4). It evolves over decades. Only multidisciplinary approaches can help define precise, cause-and-effect sequential relationships in the whole brain/body human organism.

Several additional modes of psychophysiological monitoring were used in the studies cited. They included EEG and global cerebral blood flow; polygraphic measurements of heart rate, breathing rate; and end-tidal CO₂ and oxygen saturation levels. Additional data of current interest are gamma wave EEG recordings at various frequencies and heart rate variations during each breathing cycle.

Indirect indices of stress responses include plasma assays for catecholamines (norepinephrine, epinephrine), cortisol, thyroid hormones, and prolactin. Indirect indices of stress responses become more important when prolonged, stressful sitting is being carried to the extremes represented by intensive concentrative techniques for inducing absorptions.

Other measurements of increasing relevance include blood levels of melatonin, antibodies, cytokines, and of white blood cells involved in the immune response. When practical, simultaneous assays of spinal fluid, cisternal fluid, or ventricular fluid can help distinguish between molecules released from the brain per se and the same molecules found in the bloodstream that can also arise from the pituitary gland, adrenal cortex, or adrenal medulla.” (Zen-Brain Reflections, Pp. 223-224)

- “Meanwhile, in this new millennium, the rest of us have newer conceptual options. We can choose to regard prajna’s first flashing insights within suchness as the perennial expressions of a human brain’s basic physiological functions, not just as some layers of cultural add-ons imposed by the conditionings inherited from past centuries. Our generations need not believe that seemingly thick barriers of word-thoughts, however raised, can permanently curtain off the flashing illuminations cast by these first impressions of “Reality” and of “Immanent Perfection.” For such prelinguistic messages arise selflessly, spontaneously, in *unconditioned* form. The natural truths that emerge are part of everyone’s ancient, universal biological heritage.” (Zen-Brain Reflections, p371)

**ANANDA W.P. GURUGE:
“BUDDHISM AND BIOETHICS”
THE MIDDLE WAY, LONDON BUDDHIST SOCIETY, AUGUST 2006**

Another dimension of the question of Buddhism and Science has begun to receive attention on account of the spectacular advances made in biotechnology. Here the issue is whether Buddhism has a contribution to make to the formulation of bioethical principles to regulate the work of the scientist. Religious leaders along with jurists and national policymakers express concern over the pace of development of the scientist's ability to affect life in all its dimensions. Judeo-Christian opinion prevails in public discussion and the Buddhist position has hardly been expressed.

In 1997 I was invited to present the Buddhist point of view at an international conference of scientists and national policy-makers, organized by UNESCO under the leadership of Professor Miriam Becker, UNESCO Chair of Science for Peace, UNESCO International School of Science for Peace, Hebrew University, Jerusalem, Israel and held in Como, Italy. The paper written for this conference and my other writings on the subject have since appeared in several publications: Science for Peace Series No. 6 of UNESCO International School of Science for Peace, Jerusalem, Israel, 1998; Chapter III of “Buddhist Answers to Current Issues”, Authorhouse, Bloomington, Indiana, 2005 and Hsi Lai journal of Humanistic Buddhism, Volume III, 2002 (Pp. 86-117).

To ascertain a comprehensive investigation I identified five issues:

1. Means of Mass Destruction; Chemical and Biological weapons.
2. Manipulation of life
 - Medically Assisted Procreation or Asexual Reproduction
 - The Growing Controversy on Cloning
 - Human Cloning
 - Involvement of animals in human procreation
 - Commercialization of intrinsic elements of human procreation
 - Medically assisted termination of life – Abortion and Euthanasia
3. Human Eugenics, Genetic Engineering, Euphonic and Organ Transplantation
4. Genetic Intervention in Plants
5. Genetic Manipulation of Animals and Animal Rights

My approach to bioethics was outlined under five items:

1. There are unavoidable ethical questions, which must be dealt with in the realm of biological and medical sciences and these must be raised and answers sought.

2. Biological and medical sciences should advance in research and experimentation without loss of momentum as many a serious problem of life and living is yet to be resolved.
3. Between the moralists looking at bioethical problems and scientists intently concentrating on discovery, a *via media* has to be evolved, expanding, as necessary, the principles that UNESCO has identified in the Universal Declaration on the Human Genome and Human Rights.
4. Legislators at the national and international levels should evolve principles, norms and rules to implement a collectively formulated and approved consensus and install the necessary institutional and procedural infrastructure for this purpose.
5. Nothing would be gained by the adoption of any extreme position. A basic policy, which would be conducive to the greater good of humankind, is one in which scale and intention form the primary criteria.

With these in mind, I posed myself four questions;

- Does Buddhism have specific answers to issues raised by the rapid advances of biotechnology?
- To what extent are my own views expressed in connection with each issue a reflection of my upbringing in a traditionally Buddhist environment and my extensive study of Buddhism and various interpretations thereof?
- To what extent are these views supported by the teachings of the Buddha as recorded and understood in different traditions, schools and sects?
- What guidelines can Buddhism offer in evolving a system of universal values in the domain of bioethics?

Human-centered ethics of Buddhism, as opposed to the God-and-Creation-centered position of Judeo-Christian ethics, enables Buddhists to take a far more open, liberal and science-friendly position on most issues. I explain the overall Buddhist standard in the following terms:

The Buddhist system of moral or ethical values is founded not on the dictates or commands of a supernatural being or power or force but on an empirical assessment of good and evil. The assessment is based on such criteria as

- Extending to others the same standards of likes and dislikes which one has for oneself (i.e. the Golden Rule; *attānam upamam katvā*);
- Making oneself the standard of comparison. (Dhammapada 129-30);

- Considering the reaction of one's own conscience as to whether a given action results in joy or repentance (ibid., 67-68)
- Analyzing the judgment of wise and informed persons as regards other's behavior (Karaniyamettasutta); and
- Evaluating action on the basis whether it is for the good and the benefit of the many (Kālāmasutta).

A Buddhist accepts his responsibility for adhering to a life of moral or ethical rectitude on the basis of one's own conviction. "Not by legislation but by leading one to conviction through contemplation and reflection (*nijhatiyā*)," said Emperor Aśoka after evaluating his own fifteen year campaign to reform his subjects (Pillar edict VII). Accordingly is worded the formula of Buddhist precepts or resolutions which one takes upon oneself voluntarily: *vermani sikkhāpadam samādiyāmi* – I take upon myself the discipline of abstaining from.)

Even more emphatic is the Buddha's proclamation of intention or volition as the criterion of morally effective action: "*Cetanā'ham, bhikkhave, kammam vadāmi. Cetayitvā kammam karoti kāyena vācāya manasā*" - Monastics, I call volition the kamma for having thought one acts with deed, word and thought. (Anguttaranikaya LXIII, Mahavagga 11-12).

In keeping with the overall humanistic foundation of the Buddha's teachings, his ethical system is human-centered in that the discernment of good and evil is based on an individual's judgment and is conditioned by his or her intention. This responsibility of the individual is further underscored by naming good or bad action as skillful (*kusala*) or unskillful (*akusala*). In the Vinaya, where the Buddhist jurisprudence examines in meticulous detail how blame and punishment is to be apportioned in respect to alleged offences of monastics, three factors are carefully weighed: namely, (i) intention, (ii) repentance or remorse, and (iii) self-reform. Its parallel in the moral plane is the teaching that the karmic effects of an intentional or volitional action are variable through repentance, self-reform or corrective action, and positive accumulation of merit (Pali *Puñña*; Skt. *Punya*) through charity (*dāna*), virtuous conduct (*sīla*) and the purification of the mind (*bhāvanā*). (for a detailed discussion, see Kalupahana 1995 70-112)

Each person not only creates one's own karma but also influences the effects of karma by one's own effort. No external power, force, or divinity can do anything about it. Even the Buddhas are only teachers - pointers of the way (*akkhātāro tathāgatā*; Dhammapada 276). Buddhist ethics stand in contrast to the theocentric ethics, which have hitherto had an overwhelming impact on the evolution of bioethics.

Buddhists, therefore, are bound to react differently to bioethical issues under discussion under two broad categories of (1) termination of life and (2) manipulation of life. (Guruge 2005)

The position I adopt and the plea I extend to Buddhists is as follows: As regard issues highlighted above, the urgent need is for Buddhists to take an active part in the on-going debate on bioethics. The Buddhist positions on each of these issues could have a significant impact on the evolving ethical principles and values. At the same time, the Buddhists participating in the debate would find it necessary to review the current thinking and practices in Buddhist societies. For both these ends, the promoters of Socially Engaged Humanistic Buddhism are bound to recognize how urgent it is to be involved in the evolution of bioethics as part and parcel of universal ethics. Bioethics developed without Buddhist inputs and participation will be lopsided, and will lack the power to persuade governments, organizations, opinion-builders and practitioners to act in a concerted manner to benefit humanity.

MEDICALLY OBSERVED IMPACT OF MEDITATION, BENEDICTION AND PRAYER ON GRAVELY SICK PERSONS

The critical study of the medically observed impact of prayer and benediction on gravely ill persons, like bio-ethics, is an area in which Buddhist participation is recent and minimal. A senior research paper by Dale J. Cox M. D. on “Prayer and Healing: Does Prayer Positively Affect Physical Healing?” not only discusses the Christian experience but also lists a substantial bibliography recording instances of such healing. (<http://valleyent.net/faithhealing>).

In Southern Buddhism, the chanting of Pirit or Paritta has been widely claimed to have an effect on healing as well as overall protection from danger. Venerable Piyadassi Maha Thera of Vajirarama, Colombo, Sri Lanka, who has translated the text as “The Book of Protection,” with an introductory essay on “The Value of Pirit” says,

It is interesting to observe the prevalence in Buddhist lands, of listening to the recital of the dhamma or the doctrine of the Buddha in order to avert illness or danger, to ward off the influence of malignant beings, to obtain protection and deliverance from evil, and to promote health, prosperity, welfare and well-being. (1999, available free in several editions including on-line versions)

The Mahayana and Vajrayana traditions do have a wide variety of practices and rites similar to prayer and benediction involving incantations or mantras, gestures and invocations to Bodhisattavas and supernatural powers. As regards Pirit, Venerable Piyadassi analyzes the traditional beliefs pertaining to the

power of truth, virtue, love, and sound associated with the recital of these special discourses and concludes,

There is no better medicine than truth (dhamma) for the mental and physical ills, which are the causes of all suffering and misfortune. So the recital of Paritta suttas in as much as they contain the dhamma, may, when they are listened to in the proper attitude, bring into being wholesome states of mind, which conduces to health, material progress and spiritual progress. The effect of Pirit can also transcend distance, however, great. (Ibid.) (www.lioncity.net/buddhism/index)

But the kind of scientifically validated evidence, that is available in regard to prayer, has yet to be produced in respect of Pirit and healing.

In contrast, the Tibetan experience, however, is being more thoroughly studied, as seen from the following works:

- Fenton, Peter, *Tibetan Healing: The Modern Legacy of Medicine Buddha*, 2002.
- Crow, David, *In Search of the Medicine Buddha: A Himalayan Journey*, 2002.
- Crow, David, *In Search of the Medicine Buddha: A Himalayan Journey*, 2002.
- Hansard, Christopher, *The Tibetan Art of Living: Wise Body, Mind, Life*, 2002.
- Samel, Gerti, *Tibetan Medicine: A Practical and Inspiration Guide to Diagnosing, Treating and Healing the Buddhist Way*, 2001.
- Clifford, Terry, *Tibetan Buddhist Medicine and Psychiatry: The Diamond Healing*, 2001.
- Khangkar, Dolkar, *Tibetan Medicine: The Buddhist Way of Healing*, 2000.

There is no doubt that the investigation into Buddhism and Science would eventually cover this area in greater detail.

SOME SALIENT OBSERVATIONS AND CONCLUSIONS

This brief and even cursory examination of a rather representative (but in no way exhaustive) array of writings by a variety of authors from both the East and the West over the last one hundred and twenty-five years reveals that the search for similarities, parallels and contact points between Buddhism and Science remains an unfinished task.

Buddhists and friends of Buddhism, who have been on the whole impressed by the science-friendly disposition of Early or Pali Buddhism (in contrast to the Judeo-Christian interaction with scientific findings), have made enthusiastic claims, and some may even be a bit far-fetched. But a number of important results has ensued:

1. The *Kalamasutta* in which the Buddha declares his confidence in the capacity of a human to think critically and objectively – a prerequisite for scientific inquiry – received the universal attention it deserves and continues to be upheld as the hallmark of Buddhist thinking and the earliest known Declaration of Freedom of Thought;
2. The logical reasoning behind the fundamental Buddhist doctrines of Three Signs, Four Noble Truths, Noble Eightfold Path, and Dependent Origination came to be widely recognized;
3. Impermanence (*Anicca*) and Change (*Viparinama*) as key doctrines of Buddhism were seen as supportive of the modern concept of evolution through natural selection and the survival of the fittest;
4. Advanced scientific judgment was observed as the basis for the Buddha's declaration of life as beginningless (*anamataggo'yam samsaro*) and his pragmatic insistence on not wasting time with speculation on the unknowable;
5. Buddhist concepts of cosmology with limitless and unending universes, in perpetual flux of arising, changing and disappearing, were found to be more in keeping with the current knowledge of galaxies and their evolution;
6. The Buddha's teachings on (a) the individual as a compound of interdependent psycho-somatic aggregates (Namarupa = *pancakkhadhas* = form, perception, sensation, mental formations and consciousness), (b) all things as compounded and conditioned by cause and effect (*sankhara*) and (c) the rebirth-seeking factor as an *I*-process propelled by its own volitional action (*Kamma*) were highlighted as more plausible than theo-centric theories of creation, soul and once-only earthly existence;
7. With the Buddha's recognition of Mind as the sixth sense, whose functions were analyzed in minute detail, and his emphasis on the development of the mind through meditation and higher mental states of *dhyana* as the Path of Deliverance, Buddhist teachings on the Mind are observed as constituting the principal elements of the current theories and findings in Psychology;
8. Rebirth as an explanation of the diversity of the fate and plight of humans is being increasingly accepted as plausible on the basis of empirical evidence obtained through objectively conducted research;
9. It was also recognized that, with the Buddha's own precept and example pertaining to harmonious coexistence, Buddhism had at no time obstructed or persecuted seekers of truth with any inflexible and rigid dogmas, but encouraged innovation and acceptance of innovation;

10. Some went to the extent of calling Buddhism a Science on the ground that it conformed to the scientific method of observation, evaluation of evidence, experimentation and openness to new findings and dealt with actuality;
11. Practitioners like Jon Kabat-Zinn and his colleagues, Teasdale and Padmal de Silva have demonstrated how mindfulness meditation and other Buddhist practices could effectively contribute to modern psychotherapy; and
12. James H. Austin has initiated in-depth studies into Physiological data on brain function connected with meditation (especially Zen).

With the expansion of the investigation to Mahayana and Vajrayana traditions of Buddhism, which coincided with spectacular developments in the field of Science such as the promulgation of special and general theories of relativity by Albert Einstein and quantum theory by Niels Bohr and Werner Heisenberg, Nagarjuna's concept of Emptiness in Madhyamaka philosophy has come up for scrutiny. A major perception that is evolving as a result of these studies is to be noted: as scientific research leans towards intuition-based philosophical speculation – a tendency which is increasingly evident and promoted. Scientific thought and method will progressively converge with those of Nagarjuna and even more likely with the Prasangika School of Madhyamaka. The studies compiled by Alan Wallace, which derive significant inspiration from Tibetan Buddhism, establish this point even more than they show any similarities or parallels between Buddhism and Science. Links between Zen meditation and neuroscience are being explored by James. H. Austin in his studies into the working of the brain

Nearly a century ago, Paul Dahlke proffered Buddhism as a panacea for the cure of then observed problems in Science on the ground that Buddhism dealt with actuality more realistically and hence was a superior world-view. His solutions may no longer be applicable. But it is important to note the fervent appeal of Venerable Payutto (Dhammapitaka), who is convinced that Science as “a lackey of industry” is in dire need of transformation. When the remedies he suggests for Science are taken up along with those he has with equal enthusiasm proposed for economic development (See Part I Chapter VI), two questions come to mind:

- Is the principle of ‘Small is beautiful’ applicable to scientific research and development, even if it may have relevance to economic activity under certain situations?
- Is it obligatory that to be Buddhist is to curtail a nation's capacity and potential to advance scientific knowledge and its application for national development?

The ethical considerations, which Venerable Payutto advocates, are indeed very important in that Science, which causes the deterioration of the environment or affects human life adversely, must certainly be carefully monitored and corrected.

A country needs Science to solve the ever-increasing problems of food production, health care and prevention of disease, mass transportation and the like. A strong body of scientists is a vital necessity and the implementation of Venerable Payutto's recommendations while ensuring the steady growth of scientific expertise of the nation is a significant challenge.

Finally, it has to be observed that the investigation so far has been to find similarities, parallels and contact points which Buddhists or friends of Buddhism would like to see between Buddhism and Science. The overriding purpose appears to have been to present what Buddhism can show in its favour. Time is ripe and facilities are increasingly available for the search to be broad-based and objective.

REFERENCES

1. Hajime Nakamura: A History of Early Vedanta I, Delhi 1983, Motilal Banarsidass pp. 521-523
2. Guruge, Ananda W.P. From Living Fountains of Buddhism, Colombo 1984, Ministry of Cultural Affairs, p. 339.
3. Guruge, Ananda W. P. Buddhist Answers to Current Issues, Bloomington, Ind. 2005, Authorhouse, Chapter III.
4. Plethero, Stephen, The White Buddhist, The Asian Odyssey of Henry Steel Olcott, Bloomington, Ind. 1996, Indian University Press, pp. 454.
5. Wallace, B. Alan Buddhism and Science: Breaking New Ground, New York, 2003, Columbia University Press (Columbia Series in Science and Religion) p. 47