

Buddhism, Science and Atheism

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First published in 1965 by the World Fellowship of Buddhists
BPS web edition 2006

Buddhist Publication Society
PO Box 61
Kandy
Sri Lanka
<http://www.bps.lk>

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“What, O Monks, is everything? The eye and forms, the ear and sounds, the nose and smells, the tongue and tastes, the body and touch, the mind and objects of mind. This, O Monks, is called everything. Whoso, O Monks, should say: ‘Rejecting this everything, I will proclaim another everything’, it would be mere talk on his part, and when questioned he could not make good his boast, and further would come to an ill pass. Why so? Because, O Monks, it would be beyond his scope to do so.” The Buddha, as recorded in Samyutta Nikāya IV, 15. (XXXV, 3, 26.)

Introduction

Buddhism is ancient and science is quite modern. Both are complex and thus an extensive comparison of the two must be likewise. The first section of this writing is primarily concerned with the discoveries and theories of modern science. Some of the more important of these are discussed in detail, and special consideration is given to the effect of these discoveries and theories upon Christian theology. The limitations and deficiencies of scientific inquiry are also discussed. The second section is the smallest and concerns the Buddhist view of atheism. The third and final section is the largest; it compares the Buddhist world view, Buddhist psychology and Buddhist epistemology with those of contemporary Western science. In this last section the structure and age of the universe, the structure of matter, the evolution of life, the nature of consciousness and other problems are mentioned.

It has been assumed that the reader already has an elementary knowledge of the principles of chemistry, biology and biological evolution. Persons who are not familiar with such terms as “molecule”, “inorganic”, “chromosome”, “gene”, “phosphate” and “hydrocarbon” will have difficulty understanding the short section entitled “The Nature and Origin of Life.”

In discussing the Buddhist teachings of ancient history, evolution, cosmology, *devas*, etc., the question can be raised as to whether such writings should be understood in a literal sense or merely as techniques for illustrating moral and psychological concepts. For the purposes of this writing, I have elected to take the *Suttas* at face value. That is, unless figurative intentions are clearly stated, as in the parables, I have interpreted them literally. However, the possibility of figurative meanings should not be ignored. On the other hand, there is little justification for assuming hidden or symbolic meanings of an esoteric sort. According to the *Mahāsatiṭṭhāna Sutta*, II, 25 (*Dīgha Nikāya*, II, 100), the Buddha clearly stated that he had no secret doctrines which were to be withheld from the lay public.

Douglas M. Burns, Bangkok, 1965.

Part I

Western Science and Western Religion

The Nature of Science

For the purposes of this writing we shall define science as “man’s systematic and objective study of himself and the universe.” By calling science a study we limit ourselves to what is more commonly referred to as “pure science”, the gathering of knowledge, and thus we will not be concerned with technology, the application of such knowledge to industry, agriculture and clinical medicine.

The word “objective” results in further exclusions. It confines us to sense perception experience and thereby excludes mysticism, faith, intuition and metaphysics. Science is concerned with the phenomena of matter and energy. Sense perception, mathematics and logic are the tools through which it seeks to expand man’s understanding of the physical universe. It is not involved with ethics and morality except that these are facets of anthropology, psychology and related studies.

We live in a unique century. Not only are we the heirs of 2,000 or more years of accumulated scientific knowledge; today, at a magnitude unprecedented in all history, tens of thousands of scientists in all parts of the world, aided by highly-refined instruments and assisted by generous financial support, are gathering new facts and exchanging information at a rate never before realised. Consequently we have at our fingertips a vast body of knowledge and understanding which was denied the great scholars of antiquity. Many of the deepest mysteries of nature recently have been unravelled, and others appear to be yielding to the untiring dedication of scientific inquiry.

There is, however, an unfortunate paradox. Not only is the lay public relatively ignorant and apathetic towards this hard-earned knowledge, but even more perplexing is that many self-proclaimed philosophers and intellectuals have only a rudimentary grasp of modern science. Such persons are especially ignorant of the very important discoveries made during the past 15 years. Without an ample scientific background, the seeker of truth is ever prone to fall victim to the numerous superstitions and pseudo-sciences which flourish on ignorance and emotional needs.

However, science itself is not immune to deception. It is a human creation and as such is subject to error and fraud. It has no pope or other central authority. Any persons inclined to research, even high-school students, are free to discover new facts and devise new theories, and these facts and theories can be published in scientific journals upon approval of the journals’ editors. Thus errors, fraud and premature conclusions sometimes occur. But the chain of science is far stronger than even its strongest link. For science is an accumulation of knowledge, and the alleged discovery of any one person can readily be tested and retested by others. For example, if a chemist in London announces that pure silver melts at 960.8° C., chemists in New York, Tokyo, Sydney and Rio de Janeiro can conduct the same test and compare their results. Occasionally confusion arises, as when one reputable chemist announces that he finds silver to melt at, say, 958.2° C. But further investigation reveals that this last scientist was using a sample of silver contaminated by a minute quantity of copper and thus it was not pure silver but an alloy. In such a manner our knowledge of the universe progresses.

Science Versus Religion

There are two levels to the establishment of scientific theory. First is observation, the gathering and recording of data. And on this level there is little conflict between science and religion. Second is interpretation of these observations; that is, devising a theory or explanation into some meaningful scheme or pattern. It is here that dispute arises. For example, a geologist and an orthodox Christian would walk together through a desert terrain and note the shape and erosion pattern of the hills, observe the sequence and arrangement of geological strata and discover leaf imprints imbedded in solid rock. Both would agree that

they had seen such shapes, strata and imprints. But if the Christian takes a literal view of his scriptures, he would reject the geologist's conclusion that these findings tell the story of millions of years of geological history. His religion teaches that the world was created in six days. He would be more inclined to explain the erosions as evidence of Noah's flood which was said to have covered the whole world (Genesis 7.)

The dispute as to the age of the earth was further heightened with the advent of Darwin's theory of evolution. Charles Darwin acknowledged the geological view of the earth's antiquity and combined this evidence with biological facts to formulate his now widely-accepted theory. The strength of this theory lay in the fact that it was consistent with nearly every geological, paleontological and biological datum known at that time; that is, virtually all scientific knowledge seemed to support it; and no other theory, either then or now, has been able to account for the same body of facts. Over one hundred years have passed since the founding of this theory, and virtually all the new facts collected during this time have been consistent with the original hypothesis, thus further increasing its probability.

Evolution contradicted Biblical orthodoxy on four points. First, it reaffirmed the geologist's view as to the age of the earth. Second, it said that man came from an animal rather than dust into which God had breathed the breath of life. Third, it rejected the notion that woman was formed out of a man's rib. And fourth, it stated that plants and animals had evolved simultaneously, and this evolution began some time after the establishment of the solar system. According to the first chapter of Genesis, God created the "grass, the herb yielding seed, and the fruit tree" on the third day; the sun, moon and stars on the fourth day; the fishes, whales and other aquatic life and the birds on the fifth; and land animals on the sixth.

However, Darwin's theory was more than just another example of scientific opinion disputing the word of God. *It abolished any scientific need for believing in God.* Prior to Darwin, men of faith would ask, "How could the world have come about without a Creator?" Darwin told how. In a broader sense the modern theory of evolution includes not only the formation of living organisms; it also embraces the development of planets, stars, solar systems and galaxies—the entire universe! Even today people often say, "Look at the world around you—the hills, trees, insects and grass; the sun, moon and stars! Do you really think it could have come about by chance?" The scientist's reply is not only an emphatic "yes"; it is a "yes" followed by detailed explanations and supported by a wealth of facts. Some of these explanations and facts we shall examine later.

Science does not claim to disprove the existence of God; rather it finds no reason to believe in one. From the scientific viewpoint God is a hypothesis, and among the vast body of scientific knowledge, one finds little evidence to support such a hypothesis. Often theists quite aptly reply to scientific scorn by stating, "You can't disprove God." While this is true, neither can one disprove ghosts, goblins, unicorns and the gods of Greek mythology. Non-existence is difficult to prove, but a lack of positive evidence makes the existence of ghosts, God and unicorns scientifically unlikely.

Most Christian sects have ceased their struggle against evolution, and some have sought to liberalise their doctrines in the light of scientific knowledge. There remain, however, a few groups of hard-core fundamentalists for whom the battle still rages. Not infrequently members of such groups publish writings containing a large body of facts intended to refute Darwinian theory. Because the evidence in support of evolution embraces an extensive and complex body of facts, the attempted refutations must do likewise, and to examine these thoroughly is beyond the scope of this writing. Suffice it to say, however, after examining several of these fundamentalist writings, I find that their arguments would appear convincing to one whose knowledge of science had not progressed beyond the level of two years of university training. But more extensive information reveals that such arguments are largely one-sided and inconclusive. For example, in a 1960 publication of a booklet entitled *Evolution—Science Falsely So-called* the author makes much of the fact that after 100 years of searching, palaeontologists have failed to discover any definite pre-Cambrian fossils except algae.¹

The pre-Cambrian period ended about 600 million years ago and was followed by the Cambrian period. In the early Cambrian rocks are found an abundance and variety of fossils: snails, worms, sponges and early arthropods, and all subsequent eras show equal if not greater numbers and kinds of fossils. But preceding the Cambrian, scientists have been perplexed to find only algae and a few faint and obscure traces of other life. Thus the author states:

“Many explanations have been given for the absence of fossils in the pre-Cambrian period. The simplest explanation for the absence of these forms, however, lies in the fact that they have never existed, and, if they never existed, then the theory of organic evolution is a myth, for more than half of the entire evolutionary history of life on this planet must lie beneath the Cambrian rocks if evolution has occurred.”

However, a few years prior to this writing, abundant pre-Cambrian fossils were discovered at a locality in South Australia, and all of these newly-discovered animals were small and soft-bodied, like jellyfish and worms, and thus only under exceptional circumstances could they leave fossil impressions.²

The First Cause

One of the favourite contentions used in support of the existence of God is that of first cause. “Even accepting evolution”, it is stated, “something must have set these forces in motion. Something must have created matter. You can’t have something come out of nothing.” But should these statements be true, this would not necessarily mean that this “something” has the attributes of consciousness, love or compassion; nor would it necessarily have any concern for the fate of man; nor mean that the Bible is true nor that Christ is the son of God. This first cause could just as easily be Brahma, Tao or something yet unimagined.

However, there is no need to assume the existence of any first cause. One could just as easily postulate that time has had no beginning; that history stretches backwards into infinity. (Such is the Buddhist view.) Each proton and neutron now in existence could have existed forever. The fact that such a concept staggers the imagination only shows the finitude of human understanding; our inability to imagine it does not mean it cannot be true. (In fact it is equally difficult to imagine that time did have a beginning. For we can always raise the question, “What happened before that?”) In such a beginningless universe we could visualise stars and galaxies burning out and in so doing radiating their substance into the empty regions of space. Such particles from the old galaxies would be attracted to each other by their mutual gravitational pull and in the course of millennia would form the great gas clouds that occupy large portions of the universe. In time these gas clouds would condense further to become new galaxies composed of stars, comets, meteors and planets.

Even the statement, “Something cannot come out of nothing” is open to question. In the world of everyday experience the distinction between substance and empty space is clearly apparent. But when we endeavour to probe the essence of matter, when we seek to understand nuclear physics and the nature of the elusive neutrinos, mesons, positrons and other particles which lie at the core of physical existence, matter ceases to be something tangible and concrete. Its substance vanishes into wave motions and mathematical formulae where “common sense” concepts no longer apply. In the words of the well-known nuclear physicist Dr. J. Robert Oppenheimer:

“If we ask, for instance, whether the position of the electron remains the same, we must say ‘no;’ if we ask whether the electron’s position changes with time, we must say ‘no;’ if we ask whether the electron is at rest, we must say ‘no;’ if we ask whether it is in motion, we must say ‘no.’ The Buddha has given such answers when interrogated as to the conditions of a man’s self after his death; but they are not familiar answers for the tradition of seventeenth- and eighteenth-century science.”³

Not only has our view of matter been greatly altered; Einstein’s theory of relativity has brought about radical changes in our concepts of time, space, energy and gravity. Later, in his theory of the unified field, Einstein further sought to develop a single formula which would embrace all aspects of existence—time, space, matter, energy, gravity and electromagnetic force. In such a scheme the substance of each particle of matter would be reduced to something akin to a warp or ripple in the four-dimensional continuum of space and time.⁴ Though Einstein achieved only limited success in this endeavour, it is noteworthy that of the two widely-accepted theories as to the origin of the universe, one, called the steady-state theory, postulates the germination of matter out of empty space, i.e. something born out of nothing. The proponents of this theory present evidence suggesting that a single hydrogen atom (which is the smallest and by far the most abundant atom in the universe) is born approximately once every 600,000 years per cubic metre of space. In the course of time these hydrogen atoms coalesce to form gas clouds, which in turn become new galaxies. This is

believed to occur in proportion to the rate at which the present galaxies are moving apart; it has been occurring forever in the past and will continue forever into the future.⁵

The steady-state theory is presently a point of controversy among cosmologists and may eventually fall into disrepute. For the purposes of this writing, however, it is ample to demonstrate that there are alternatives to assuming the existence of a first cause.

Atheism

Of all the words in the English language few are wrought with uglier connotations than the word "atheism." In the minds of many Christians it is a dreaded word which implies emptiness, sin, wickedness and sensuality. But literally it means only "*a theos*", i.e. "without god", or "no god." Atheism does not necessarily mean cynicism, nor does it mean amorality, nor absence of love, nor purposelessness, nor evil. It means only one thing—no god. Yet it is almost impossible for the average Westerner to appreciate this. His whole religious tradition has emphasised the sin of disbelief. Failure to believe in God is not just a matter of ignorance or misinformation or an error in judgement; it is a sin punishable by eternal damnation. In the words of Jesus Christ, "He that believeth and is baptised shall be saved; but he that believeth not shall be damned." (Mark 16:16.) The logic of theistic religion leads one to the conclusion that there can be no purpose in life and no reason for morality without God. One often hears the statement, "Why be good if you don't believe God will punish you?" Or in extreme cases the disbeliever is asked, "If you don't believe in God, why don't you kill yourself?"

The Western world has come to believe that everything which is good, meaningful and moral is inseparable from a belief in God. Yet if we assume this to be true, we are confronted with a host of paradoxes. Not the least of these is that among Americans and Europeans one frequently meets happy, moral atheists. Such people are stable, conscientious and self-sacrificing members of society who raise good and happy families, yet they do not believe in God. Anthropologists have described the atheistic peoples of Burma and Thailand as being among the most generous and happy in the civilised world. Perhaps the best example of an atheist state in Western history is to be found today in the Soviet Union; yet paradoxically from the theistic standpoint, the average Russian (not to be confused with the Soviet leaders) is strongly puritanical with regards to both sexual morals and social responsibility. The sexual Puritanism of modern Russians excels that of the Christian free world, and it is doubtful that this can be attributed solely to totalitarian suppression. Rather it appears to be an aspect of Russian culture which preceded communism but which has been fostered by the communist party. For example, in *The Saturday Evening Post* one reporter commented after spending two years in the Soviet Union:

"I often was amazed by young men with their university studies behind them who confided to me their secret love for a woman. They sounded just like Pushkin's hero, Eugene Onegin, and particularly like Onegin in his well-known letters to Tatiana. In their description of their loved ones they emphasised the emotional and intellectual factors exclusively. They talked for hours about the girl's moral qualities, to the complete exclusion of her physical ones."⁶

The solution to this enigma lies in the fact that thought and feeling are two separate aspects of the psyche. A materialist world view does not necessarily mean a materialist value system. One may have no belief in God and yet possess deep feelings of love, compassion and social responsibility.

It should not be assumed that scientific atheism in the free world is an organised social institution. It is not. While there are small atheist groups, the great majority of disbelievers regard their convictions as personal matters and are content to let the next man believe as he sees fit. Nor should one assume that scientists are necessarily atheists. Many scientists feel that some type of Cosmic Intelligence lies behind the workings of nature, though few will anthropomorphise this or associate it with dogma to the degree advocated by orthodox religion, and nearly all of them admit that such a conviction is not founded on scientific evidence. In fact one occasionally meets a fundamentalist Christian who enters a scientific career for the deliberate purpose of demonstrating to himself and the world that science supports God.

Materialism

Excluding God, rejecting the occult and divorced from metaphysics, scientific atheism upholds one thing and one thing only as the basis of reality—matter. Matter, it believes, is the essence of existence. The keys to understanding life and consciousness are to be found among the laws of physics and chemistry.

Whether we like this notion or not, it is no exaggeration to say that the evidence for a chemical interpretation of life and consciousness is immense. So much so in fact that today most scientifically educated people have little doubt that this is true.

The Nature and Origin of Life

No longer do biologists conceive of living organisms as being possessed of a “vital force” or some other spiritual quality. Instead, all of the bodily functions—metabolism, growth, reproduction, digestion, locomotion, sensory stimulation, etc.—are believed to result from intricately-balanced chemical reactions which occur inside the cells of the body and in the body fluids. If a foreign chemical which inhibits these essential functions is introduced into the body, the normal chemistry is disrupted and no longer operates; in other words, the organism dies. Such a chemical is a poison. Certain other chemicals are essential to the continuation of life. These are vitamins, amino acids, carbohydrates and salts.

Because many hundreds of different and complex chemical reactions occur in the body of each living species, the details of most of these are still unknown, but already a host of enzymatic, reproductive and metabolic processes (including photosynthesis, the process by which plants utilise sunlight, carbon dioxide and water to manufacture sugar and oxygen) have been mapped out in minute chemical detail. With each passing month more and more of these processes are being unravelled by biochemists.

Granting the chemical basis of life there still remains the problem of how such a complex and finely arranged structure as a living cell could come into existence. Even the lowly amoebas and bacteria are composed of many hundreds of intricately-arranged protein molecules each containing several thousand atoms. Such organisms also possess anatomical structures such as a nucleus in amoebas, a cell wall in bacteria and ribosomes in both.

However, bacteria and protozoans are by no means the smallest nor the simplest of living things. Among the viruses are organisms less than 1/100,000 of a millimetre in diameter; that is, it would take over 2,400,000 to form a line one inch long. These smaller species of viruses appear to be little more than protein crystals containing either a DNA or RNA core. They possess no sensory or digestive organs and are devoid of locomotion. The adenovirus, for example, like several others, has cubic symmetry in the shape of a regular icosahedron. In other words, it is a minute protein crystal which has 20 surfaces, each in the shape of an equilateral triangle. Yet viruses can be classified as living organisms, for they reproduce themselves, and some species are known to produce enzymes.⁷

If we assume that all forms of life evolved from a primitive micro-organism similar to a virus, and if we further assume that such a micro-organism was formed out of inorganic matter, then three things must be demonstrated. First, we must show that the chemical units of life (i.e. amino acids, hydrocarbons, etc.) can be formed out of simple inorganic minerals. Secondly, we must explain how such chemical units could have come together in a sequence and arrangement suitable to form a living molecule. Thirdly, we must demonstrate that such a chemical aggregate could reproduce itself by forming viable progeny. All three of these requirements have been satisfied by scientific inquiry.

How can the chemical units of life be formed out of inorganic matter? Before the emergence of life on earth, approximately three billion years ago, the oceans and atmosphere were warm and are believed to have contained relatively high concentrations of carbon dioxide, ammonia, phosphates, sulphides, nitrates, methane and numerous other inorganic chemicals. These chemicals were perpetually agitated by the heat of the sun and the heat of the newly-formed earth; also, they received additional energy from ultraviolet radiation, lightning and cosmic rays. Using these same chemicals and same energy sources scientists have created adenine (a complex DNA base) and many of the hydrocarbons and amino acids which are the basic constituents of all living organisms.⁸ Thus most of our first requirement has been met.

However, some of the chemical ingredients of life have been synthesised only by rather complex laboratory procedures such as would not occur in nature. Also, we still have

the problem of bringing these chemical units together into an arrangement—suitable to constitute a living organism. Both these problems can be overcome by one factor—time. Assuming that all of the essential elements and most of the essential molecules needed for the formation of life were continually interacting in a warm primeval ocean, life would eventually be formed. With 100 million square miles of ocean surface and 100 million years of time the fortuitous occurrence of a living unit would be expected by chance alone. Sooner or later a suitable combination of elements would occur. In fact the probability is so great that the emergence of life need not be considered a miracle; rather it would be a miracle if life had not emerged!⁹

Our third and final requirement demands that we demonstrate that a relatively simple chemical unit can both reproduce itself and determine the chemical functions of a living organism. Such a chemical has been known for several years and is found in every cell of every living species. Whether man or virus, insect or plant, it is a universal component of terrestrial life. This substance is known as deoxyribonucleic acid, or DNA (or in some cases ribonucleic acid, RNA, which differs from DNA only by the presence of one additional oxygen atom.) There are four kinds of DNA molecules. A chain of these molecules can produce another DNA chain of equal length, and this second chain can produce a third identical to the first. In addition a DNA chain can also produce a chain of RNA. The arrangement of the four kinds of DNA in a DNA chain determine the arrangement of the four RNA types in the RNA chain. RNA chains in turn are the agents which arrange the 20 kinds of amino acids into their proper sequence for building large and complex protein molecules such as those mentioned above. Each type of RNA chain carries one specific type of amino acid. The proteins built by this process are the basic units of body tissues and are also the basic units of enzymes. Enzymes in turn control the numerous chemical activities of the body such as digestion, metabolism, etc. *In summary, DNA is a universal component of life; DNA reproduces itself; it also determines RNA; RNA determines proteins; proteins determine body tissue and biochemical reactions.*¹⁰

Genes, chromosomes and reproductive tissue in general always contain DNA. Each chromosome consists of chains of several thousand DNA units, and the sequence of the four DNA types in these chains is analogous to a four-letter alphabet which spells out the chemical structure of all future generations. The smaller viruses, which are the simplest and smallest of living things, consist solely of a DNA or RNA core surrounded by a layer of protein.

Thus with the discovery of DNA and its functions, biologists have learned how a relatively simple molecular structure can reproduce itself and also determine the nature of bodily functions. If we define life as the ability of a unit to reproduce itself, then science has already created life. For a synthetic DNA chain can be placed in a solution of synthetic DNA molecules and in the presence of a catalyst enzyme will arrange the separate DNA molecules into other DNA chains identical to itself.¹¹ Also, by chemically altering the DNA or RNA of various species of plants, animals and microbes, scientists have caused stable, viable mutations; that is, they have formed new races.¹² In a similar manner natural evolution has occurred by the fortuitous alteration of DNA as a result of radiation or other factors which alter molecular structure.

Once a self-duplicating molecule had been formed in a primeval ocean, it would reproduce itself by interacting with the free chemical units with which it would come in contact. Eventually chemical reactions would occur which would alter the structure of certain of its progeny. Some of these altered forms would be more chemically stable and reproduce more successfully than others. Thus in the course of time separate and “competing” races would be formed. Gradually some of these virus-like organisms would increase in size and complexity to become one-celled species like bacteria. Among certain species of one-celled organisms living today, a pair of these often stick together and swim around as one two-celled animal. Other races swim in groups of four, others in eights, sixteens, sixty-fours, etc. until we come to the volvox, which is a hollow sphere of several thousand cells. Each volvox cell is a separate and self-sufficient organism, but together these cells act as one multi-celled creature.¹³ Thus nature has bridged the gap between single-celled and many-celled plants and animals. At this stage evolution is well under way.

From the above statements it should not be assumed that science fully understands life. It does not. There still remain perplexing mysteries, such as the nature of biological clocks and the regulation of tissue growth and differentiation in a developing organism. But with each passing year more answers are found, and so far all of these answers have been of a chemical, i.e. material, nature.

Materialist View of the Mind

Not only has science challenged the spiritualist interpretations of life, it also has probed the nature of consciousness and presented the hypothesis that mind, too, can be explained by the laws of physics and chemistry. Human consciousness, it says, is the product of a highly-evolved nervous system. This assertion is far from being proved, and it may never be proved. But, nevertheless, the evidence in support of it is strong and warrants serious consideration.

Man's brain contains over ten billion nerve cells, which are interconnected by a vastly complex network of fibres. By means of these fibres nerve cells send messages to each other in the form of electrical impulses. By means of nerve fibres from the skin and sensory organs, the brain cells receive information about the outside world. Recently several independent investigations have suggested that memory is stored by a system of coding which takes place in the chemical structure of the large RNA molecules of the nerve cells.¹⁴

Anyone who chooses to reject the hypothesis that mind is determined by the brain should first ponder the following questions: If brain is not the basis of mind, why do we have brains at all, and why does man have a far larger brain than any other animal of comparable size? Why do strokes, tumours, aging, trauma and other agents of damage to brain tissue often cause loss of consciousness, memory defects, impaired intelligence or personality change? *Why do chemicals which affect brain tissue alter states of consciousness? Why do certain chemicals, like barbiturates, causing sleep, and others, like LSD and mescaline, produce sensations of expanded consciousness, feelings of mystical experiences and sensations of oneness with the universe?* Why is it that if the connecting fibres between the two halves of the brain are severed, one half of the brain will not know of the activities performed or information stored in the other half?¹⁵ Why is it that electrical stimulation of the brain produces vivid recall of memories, involuntary speech and activities, deep sleep, dream-like awareness or alert consciousness; and feelings of sorrow, pleasure, fear, etc.? And why is it that the results of such electrical stimulation are often predictable by determining the area to be stimulated and the amount of voltage to be used?¹⁶

In the light of such facts Dr. Ralph W. Gerard of the University of Michigan Mental Health Research Institute has made the following statement:

“Subjective awareness presumably has value or it would not have evolved. Yet it remains inconceivable in the light of our present knowledge that conscious experience can direct the material events of the brain. Rather, the active neurones and synapses seem to be responsible for both behaviour and consciousness. All our knowledge of brain and behaviour won in recent decades harmonises with this view. Formerly, what happens in that soft, greyish mass, the brain, had to be inferred. Now, with tubes and wires, drugs and electric currents probing minutely the cells that compose it, the answer remains the same. Our increasing knowledge reveals no capacity of the brain that need be more than the action of a responding mechanism.”¹⁷

Thus in its ultimate development scientific materialism leads to the most mechanistic of all possible philosophies: Man is nothing more than a biochemical machine, a chance creation in a blind and indifferent universe. One might ask whether it is possible to have a world view more bleak, barren and depressing. Yet despite the fact that we might not like this view, we must have the courage to admit its possibility. It might be true. There is much evidence to support it, and no one as yet has disproved it. By rationalising the facts and hiding from the conclusions we will only create a fool's paradise, which in no way will alter the true structure of the universe.

But again we must emphasise that a materialistic world view does not necessarily mean a materialistic value system. Our beliefs do not always determine feelings. A large percentage of atheists not only live happy, respectable lives; many find nature to be a fascinating world rich in interest and wonder. For them the mechanistic world view is anything but bleak and depressing.

Ancient Materialisms

As a point of historical interest, it is worth noting that materialistic atheism is not entirely the product of modern science. An almost identical philosophy was devised by the Greek philosopher, Democritus, in the fifth century B.C.:

“As their name implies, the atomists held that the ultimate constituents of the universe are atoms, infinite in number, indestructible, and indivisible. Although these differ in size and shape, they are exactly alike in chemical composition. Because of the motion inherent in them, they are eternally uniting, separating, and reuniting in different arrangements. Every individual object or organism in the universe is thus the product of a fortuitous concourse of atoms. The only difference between a man and a tree is the difference in the number and arrangement of their atoms. Here was a philosophy which represented the final fruition of the materialistic tendencies of early Greek thought. Democritus denied the immortality of the soul and the existence of any spiritual world. Strange as it may appear to the minds of some people, he was a moral idealist, affirming that ‘Good means not merely not to do wrong, but rather not to desire to do wrong.’”¹⁸

Also, at the time of the Buddha, similar ideas were being advocated by certain Indian philosophers:

“Man is constituted out of the four elements; when he dies earth combines with earth, water with water, heat with heat and air with air; the sense functions are merged in the ether and all that is left of him are his greyish bones after the cremation; the value of the alms-giving is merely in the imagination of the giver and to affirm the moral consequences of the act is a hollow assertion; both the foolish and the wise are annihilated and completely cut off at death.”¹⁹

These ancient materialistic schools, however, differed from modern materialism by being founded on philosophical speculations instead of objective observations.

The Limitations of Science

The reader will recall that we began this writing by defining science as “man’s systematic and objective study of himself and the universe.” Science is concerned with material phenomena as perceived through the eyes, ears and other organs of sense perception. Consequently, if there exist ways of knowing or perceiving other than sense perception and logic, or if there is any sort of existence apart from matter and energy, then science has automatically excluded itself from utilising these other types of knowledge or discovering these other levels of existence. Consider for a moment some of the yet unsolved mysteries of biology, such as the regulation of tissue growth and differentiation in a developing animal, or the nature of the puzzling biological clocks (i.e. an organism’s ability to know time despite all artificial manipulations of its environment.) Conceivably a major factor in such phenomena could be a non-physical form of intelligence or consciousness which regulates these functions. If such is the case, science, as we now know it, would never be able to discover this because of the very restrictions it has imposed upon itself.

Dependence upon sense perception data results in two levels of uncertainty. First is the fact that scientific theories are founded on inductive reasoning. That is, they are conclusions about the general scheme of nature based upon a finite number of observations. For example, every animal and plant tissue examined so far contains DNA; therefore it is assumed that all terrestrial life contains DNA, but we have no guarantee that some day a biologist is not going to find a living species totally lacking in this substance. The probability of such a find becomes increasingly remote as more and more specimens are examined, but the probability will never reach zero. Another example: Knowing the melting point of iron, the half-life of uranium, the combustibility of hydrogen and all other physical properties of matter as measured in our laboratories, scientists assume that these properties were the same 10 million years ago as they are today, and they further assume that these properties are the same on Mars, Jupiter and in the most distant galaxies as here on earth. While such assumptions are probably valid, we cannot at present be certain that this is true. Yet, on these very assumptions are founded some of our most cherished theories.

The second level of uncertainty concerns the accuracy with which sense perception experience portrays the true nature of existence. Our knowledge of relativity and nuclear physics has already revealed that “commonsense” or sense perception understanding is a distortion of the true qualities of time, space and matter. Truly, science’s endeavours to probe the deepest mysteries of nature may be analogous to a team of blind men attempting to map the earth.

As a direct correlative to this latter problem, we should note that there is one question which science, as we now know it, will probably never answer. That is: Why should the universe exist in the first place? Granting that we can tentatively explain all phenomena on the basis of matter and physical laws, why do matter and these laws exist? Why is the universe not just empty and void? So far the only suggested answers have come from metaphysics and mysticism.

However, mystical conclusions, such as those arising from faith and intuition, are heavily coloured by emotional needs and social indoctrination. Men who have attempted to utilise these approaches to truth usually have reached divergent conclusions, which defy independent verification. For this reason science at present has little choice but to continue on its present course.

The Enigma of the Occult

In spite of all that has been stated above, there still remains one body of phenomena which so far has not only defied mechanistic explanation; it has challenged the very foundations of mechanistic dogma. That is not to say that such phenomena contradict the cherished theories of evolution, relativity and biochemistry. For they do not. But they do pose a problem to the assumptions of mechanistic determinism. The phenomena in question are those of parapsychology—telepathy, clairvoyance, precognition and possibly psychokinesis.

Take, for example, the case of Mrs. Gloria Stewart, an English woman who agreed to take part in a telepathy test while vacationing in Belgium. She was chosen for this experiment because of achieving exceptionally high scores on similar tests which involved much shorter distances. At a prearranged time she was to try and guess the sequence of cards (as determined by random digits) while these cards were being read by a person in London. Out of 950 guesses Mrs. Stewart guessed correctly so many times that if we were to interpret this as being due to chance the probability of getting an equal or greater number of correct guesses in any sequence by chance alone would be one chance in 100 billion!²⁰

Even more incredible is a reported experience of Dr. S. G. Soal, a noted researcher in psychic phenomena. On one occasion Dr. Soal was investigating an alleged medium who, during a séance, claimed to be in contact with the spirit of one Gordon Davis. Though Dr. Soal had been careful to reveal no facts about himself to the medium, he had had a childhood friend named Gordon Davis, whom he believed to have died in World War I. In the following séance the medium described in considerable detail the home in which Davis was living—exterior, interior ornamentation and even a wife and child. Though Dr. Soal regarded this as pure fiction, nevertheless, he took notes on what was said and filed them away. Three years later he learned that Gordon Davis was not dead after all, and he went to visit his old friend. To his surprise he found Davis married with one child and living in a home virtually identical in every detail to that described by the medium. Most significant, however, was that Davis had not moved into this house until almost a year after the séance, and the interior ornamentation had come about largely fortuitously! The fact that Dr. Soal was able to consult his notes from the séance eliminated any chance of retrospective falsification. And the case is further strengthened by the fact that Dr. Soal is regarded as one of the most critical and honest workers in his field.²¹

Paranormal phenomena, however, are rare and subtle, and the matter is further complicated by the occurrence of fraud and carelessly conducted experiments. Many persons have ignored the hazard of subliminal perception in short-range telepathy tests and have given paranormal explanations to phenomena which could be explained in other ways.²²

Nevertheless, the great body of evidence strongly suggests that paranormal phenomena do exist. They are probably real, and the sceptic has great difficulty in arguing to the contrary. But little more than this can be concluded. The hows and whys remain shrouded in mystery, and any religious or philosophical opinions derived from these phenomena must be regarded as speculative at best.

It is not surprising that scientists are often reluctant to admit the existence of the paranormal. I recall clearly a conversation with a psychiatrist, whom I knew quite well. We were discussing the physiological basis of consciousness, and I inquired as to his opinions concerning extra-sensory perception. His reply was surprisingly candid and equally unscientific. He said, "I repress it. These things are disconcerting, and I don't let myself think about them. We have too big an investment in our mechanistic view." Had my friend not been a psychiatrist and somewhat insightful regarding his own feelings, his response might have been more typical of scientists. That is, he might have dismissed the whole idea as superstitious nonsense in an irritated tone of voice. This is another example of the discrepancy between thought and feeling. For scientific training and scientific knowledge do not guarantee scientific objectivity when one's cherished convictions are threatened.

Part II

The Buddha and God

Black and White and Shades of Gray

Western man is predisposed to reasoning with a two-valued system of logic. We quite often divide existence into a series of dichotomies. A thing either is or is not; there is no other alternative. Cultural patterns often reinforce this notion. In many nations there are two, and only two, major political parties, and in each election either one side or the other will win. The same is true of major athletic events. Things often are viewed as either right or wrong; good or bad; true or false.

This same sort of reasoning frequently occurs in religious thought. In fact it has often been an unspoken axiom of Christian theology. God either exists or he does not exist. There is no middle ground. Not uncommonly Christian fundamentalists are heard to say, "Either Christ was what he claimed to be, the Son of God, or else he was a mad man, the greatest liar in all history." And in Matthew 12:30 Christ himself is quoted, "He that is not with me is against me."

Buddhist logic, however, is four-fold. A thing either is, or is not, or both is and is not, or neither is nor is not. For example, space can be either finite, or infinite, or both finite and infinite (i.e. finite in one dimension and infinite in another), or neither finite nor infinite (i.e. space does not exist as an external reality but rather is an aspect of our consciousness.) Or again an object can be either red; or not red (i.e. some other colour); or both red and not red (i.e. either mottled red and some other colour(s) or changing colour so that it is only red some of the time); or neither red nor not red (i.e. the object did not exist in the first place.)²³

The Spectrum of Deity

In the first chapter of Genesis the Lord Jehovah "created man in his own image." And to Moses he said, "I the Lord thy God am a jealous God." (Exodus 20:5). Throughout the Old Testament we read of the wrath of God and the love of God. In Exodus 33, "the Lord spoke unto Moses face to face, as a man speaks unto his friend." But he explains to Moses that he can not allow any man to look upon his face, so in order to show himself to Moses he "will put you in a cleft of the rock, and will cover you with my hand while I pass by; and I will take away my hand, and you shall see my back parts: but my face shall not be seen." Here we have a classic example of anthropomorphic deity, but 1,200 years later Christ says, "God is a Spirit." (St. John 4:24), and in Christianity we find the concept of deity slightly altered. He is still personal. Christ is his Son. He loves us and cares for us, but in some way he appears more ethereal, less manlike than the Jehovah of the ancient Hebrews.

The Hindus speak of Brahma, the Cosmic Intelligence, the Infinite Being, the Timeless Reality. Rather than "He", Brahma is "It." It is impersonal, beyond time and space, the Superstructure of the Universe. Yet Brahma can manifest in a form which possesses love and compassion and concern for the fate of man. It intervenes in the course of history and may even create a physical body to communicate with man and teach him the way to salvation. Brahma is both honoured and worshipped.²⁴

After Brahma, we find in China the mystic Tao. It is not described as possessing intelligence, or love, or communicating with man in any human language. Yet it is the source of all creation, the way of nature, the essence of all true goodness. By harmony with the Tao men find meaning in life and a virtue which is both genuine and spontaneous. It is described in the Tao-te-Ching:

“Something there is, whose veiled creation was
 Before the earth or sky began to be;
 So silent, so aloof and so alone,
 It changes not, nor fails, but touches all:
 Conceive it as the mother of the world.” (25)
 “They call it elusive, and say
 That one looks
 But it never appears.
 They say that indeed it is rare,
 Since one listens,
 But never a sound.
 Subtle, they call it, and say
 That one grasps it
 But never gets hold.” (14)

The Tao is honoured but not worshipped.²⁵

In *Mahāyāna* Buddhism *Nirvāna* is said to be one with *Samsāra*, the world of cause and effect and everyday experience. Yet the Mahāyāna description of Nirvāna, in spite of its relation to physical existence, is timeless, changeless, non-compounded and eternal. It is the mysterious Void and is not conceived as possessing love, intelligence or in any way altering the course of history. Yet it is real, a transcendent realm of existence, and realisation of it is said to be the highest achievement of sainthood. Nirvāna is neither honoured nor worshipped.

Finally, we come to Einstein’s hypothesis of the unified field, an impersonal mathematical formula, which attempts to provide a common denominator to matter, energy, time, space, gravity and electromagnetic force. It postulates one unifying principle which embraces all existence and accounts for all phenomena. By now we are at the threshold of scientific atheism.

Having started with Jehovah and proceeded through God, Brahma, Tao, Mahayanist Nirvāna and ended with the unified field, where in the process did we abandon deity? Clearly, the problem is relative. When a Westerner asks, “Does God exist?” and at the same time imposes upon himself a two-valued system of logic, he automatically offers himself only two choices, neither of which may be true. The question is better worded, “To what extent and in what form, if any, does God exist?” From a Buddhist perspective, the answer might lie within the third value of logic, i.e. “God both exists and does not exist.” For example, one may imagine God as the Being with infinite knowledge, infinite wisdom, infinite love and infinite power. Yet He (or better It) may possess knowledge and wisdom but have no love or power. Or It may lack only wisdom, or possess only love, etc. The matter is more complex than usually envisaged.

Buddhism and Atheism

With regard to the extremes of theism and atheism, Buddhism in its original form must be classified as atheistic. In the *Visuddhimagga*, Buddhaghosa quotes an ancient poem which contains the following stanza:

“No god, no Brahma, can be called
 the maker of this wheel of life.
 Phenomena only roll on,
 dependent on conditions all.”²⁶

While these words probably were not spoken by the Buddha, they nevertheless illustrate the Buddhist world view, i.e. the cosmos is regulated by impersonal laws of cause and effect. There is no such thing as divine intervention. Nature is impartial. It cannot be flattered, nor does it grant special favours upon request. In the *Tevijja Sutta* of the *Dīgha Nikāya* Gotama Buddha is quoted:

“Again, Vāsetṭha, if this river Aciravatī were full of water even to the brim, and overflowing. And a man with business on the other side, bound for the other side, making for the other side, should come up, and want to cross over. And he, standing on this bank, should invoke the further bank, and say, ‘Come hither, O further bank! Come over to this side!’ Now what think you, Vāsetṭha? Would the further bank of the

river Aciravati, by reason of that man's invoking and praying and hoping and praising, came over to this side?"

"Certainly not, Gotama!" Vāseṭṭha replied.

The Buddha continued:

"In just the same way, Vāseṭṭha, do the Brahmans versed in the Three Vedas—omitting the practice of those qualities which really make a man a Brahman; and adopting the practice of those qualities which really make men non-Brahmans—say thus: 'Indra we call upon, Soma we call upon, Varuna we call upon, Isāna we call upon, Pajāpati we call upon, Brahma we call upon, Mahiddhi we call upon, Yama we call upon!' Verily, Vāseṭṭha, that those Brahmans versed in the Three Vedas, but omitting the practice of those qualities which really make a man a Brahman, and adopting the practice of those qualities which really make men non-Brahmans—that they, by reason of their invoking and praying and hoping and praising, should, after death and when the body is dissolved, become united with Brahma—verily such a condition of things can in no wise be."

And again in the same sutta the Buddha is quoted:

"Now what think you, Vāseṭṭha? The Brahmans versed in the Three Vedas, who can very well—like other, ordinary folk—see the Moon and the Sun as they pray to, and praise, and worship them, turning round with clasped hands to the place whence they rise and where they set—are those Brahmans, versed in the Three Vedas, able to point out the way to a state of union with the Moon or the Sun, saying: 'This is the straight path, this is the direct way which makes for salvation, and leads him, who acts according to it, to a state of union with the Moon or the Sun?'"

"Certainly not, Gotama."

"So you say, Vāseṭṭha, that the Brahmans are not able to point out the way to union with that which they have seen, and you further say that neither any one of them, nor of their pupils, nor of their predecessors even to the seventh generation has ever seen Brahma. And you further say that even the Rishis of old, whose words they hold in such deep respect, did not pretend to know, or to have seen where, or whence, or whither Brahma is. Yet these Brahmans versed in the Three Vedas say, forsooth, that they can point out the way to union with that Brahma whom they know not, neither have seen. Now what think you, Vāseṭṭha? Does it not follow that, this being so, the talk of the Brahmans, versed though they be in the Three Vedas, turns out to be foolish talk?"

Evil and Suffering

Scientific accuracy and a valid world view, however, were not the Buddha's major concerns. Instead, what mattered most was the existence of suffering, both physical and psychological, and in this regard he made some of his strongest statements concerning God.

In Isaiah 45:6-7 the Lord Jehovah is quoted:

"There is none beside me.
I am the Lord, and there is none else.
I form the light, and create darkness.
I make peace, and create evil.
I, the Lord do all these things."

As if in reply, the Buddha is alleged to have spoken:

"He who has eyes can see the sickening sight.
 Why does not Brahma set his creatures right?
 If his wide power no limit can restrain,
 Why is his hand so rarely spread to bless?
 Why are his creatures all condemned to pain?
 Why does he not give happiness to all?
 Why do fraud, lies, and ignorance prevail?
 Why triumphs falsehood, truth and justice fall?
 I count your Brahma one among the unjust,
 who made a world in which to shelter wrong." ²⁷

It is often replied that it is man who makes evil and not God. But man does not create flood and drought, which have claimed the lives of untold millions. Nor did man create hookworm, malaria, yellow fever, tuberculosis, leprosy, plague, influenza, meningitis, whooping cough, and the numerous other species of germs which have drained away the energy, health and lives of many billions of innocent victims most of whom have been children. Why were these organisms created?

Nor can God claim complete innocence from human misdeeds. Evil actions result from evil motivations, and many is the believer who has pondered, "Why did God give me these feelings of hatred and passion and then tell me that they are evil? Why does he create in me a desire for this woman and at the same time say it is wrong to have her? I did not ask to have such desires!" Or why does God allow innocent persons to suffer at the hands of evil men? If God really intervenes in history, why was Adolph Hitler allowed to come into power, and why have millions been permitted to suffer religious persecution in God's own name? Why has God allowed the godless force of communism to expand to its present size and indoctrinate one third of the human race? Again the Buddha is quoted:

"If there exists some Lord all-powerful to fulfil
 In every creature bliss or woe, and action good or ill,
 That Lord is stained with sin.
 Man does but work his will." ²⁸

The Buddha noted that despite prayers, penances and offerings the devout suffered as much as the disbelievers. No help ever came from above, though fortunate occurrences were usually interpreted as such. Instead all events, mental as well as physical, he discovered to result from natural laws of cause and effect. Therefore, salvation, he said, is to be found by understanding and utilising these laws to shape our own destinies. On one occasion he spoke:

"There are ascetics and Brahmans who maintain and believe that whatever a man experiences, be it pleasant, unpleasant or neutral, all that is caused by God's act of creation. I went to them and questioned them (whether they held such a view), and when they affirmed it, I said, 'If that is so, venerable sirs, then people commit murder, theft and unchaste deeds due to God's act of creation; they indulge in lying, slanderous, harsh and idle talk due to God's act of creation; they are covetous, full of hate and hold wrong views due to God's act of creation. Those who fall back on God's act of creation as the decisive factor, will lack the impulse and effort for doing this and not doing that.'" ²⁹

Or more succinctly in the words of Aśvaghosa:

"If God is the cause of all that happens, what is the use of man's striving?" ³⁰

To state the case in terms of a contemporary example, prior to this century, in many parts of America and Europe diphtheria was the most common cause of childhood death and on the average took the life of one member of each family. We can safely assume that most of the children afflicted with diphtheria, if they were old enough, as well as their family and friends, prayed for survival. Yet the mortality rate remained tragically high. Then medical science devised a means of chemical immunisation and later discovered antibiotics. Now diphtheria has become such a rare disease that in many countries the average physician will not see even one case in his entire medical career. Has medicine antiquated prayer? Most Westerners believe in a God who is all-powerful and loving. Yet how strong is their faith? If one was critically ill with advanced pneumonia and was given the choice between penicillin and prayer, it is doubtful that many would choose the latter.

Jesus once said:

“Have faith in God. For verily I say unto you, That whosoever shall say unto this mountain, Be thou removed, and be thou cast into the sea; and shall not doubt in his heart, but shall believe that those things which he saith shall come to pass; he shall have whatsoever he saith. Therefore I say unto you, What things soever ye desire, when ye pray, believe that ye receive them, and ye shall have them.” (Mark 11:22-24)

In line with this passage is the story of a country parson who once reprimanded his congregation: “You have all come here to pray for rain, but not one of you sinners has brought an umbrella!”

Pragmatic and Empirical

“Once the Buddha was living at Kosambī in the *siṃsapā* grove. Then the master gathered up a few *siṃsapā* leaves in his hand and said to the monks: “What do you think, monks, which is greater in quantity, the handful of *siṃsapā* leaves gathered by me or those in the forest overhead?”

The monks replied:

“Not many, Lord, are the leaves in the handful gathered by the Enlightened One: many are the leaves in the forest overhead.”

To this the Buddha said:

“Even so, monks, many are those things I have realised, but not declared to you; few are the things I have revealed unto you. And why have I not revealed them, monks? Because they are not useful, are not conducive to the life of purity; they do not lead to disgust, dispassion, to cessation, to tranquillity, to full understanding, to full enlightenment, to Nibbāna. That is why, monks, they are not declared by me. And what is it, monks, that has been declared by me? This is suffering (*dukkha*) this have I declared. This is the origin of suffering—this have I declared. This is the cessation of suffering—this have I declared. This is the way leading to the cessation of suffering—this have I declared.”³¹

The Buddha did not deny the possibility of some cosmic entity or other unifying principle which lies at the basis of existence, nor did he affirm such a possibility. He merely remained silent on this point for three reasons. First, assuming that such an entity exists, it would transcend time, space, matter and sense perception experience. Thus it would be totally beyond the limitations of normal human experience and conceptual understanding, and consequently any words, concepts or discussions about its nature would be meaningless, futile and misleading. Secondly, the fact that it would transcend human experience would make its existence both unverifiable and irrelevant to the problems of survival and suffering. Thirdly, the fact that all mental and physical events arise from mundane processes of cause and effect means that there is no divine intervention; the existence of some cosmic entity has no immediate bearing on life’s problems, and thus a belief in such an entity which leads one to prayers, ritual and ceremony deludes man and turns his efforts away from more constructive approaches to life’s problems.

The reader may well wonder if Nibbāna as originally taught by the Buddha (i.e. as described in the Theravāda or Pāli texts) could not be equated with the hypothetical cosmic entity discussed above. Nibbāna is described as the transcendent condition which one experiences after achieving perfect mental purification and development of profound insight and wisdom. It is said to be timeless, changeless and not compounded. It is also said to be in no way related to this conditioned world of cause and effect. This is all that we are told. On no occasion did the Buddha describe Nibbāna as being the Superstructure of Existence, Cosmic Consciousness or Ultimate Reality. It can be understood only by direct experience, and thus he said little about it. Discussions and speculations are not only futile and misleading; they divert one’s attention from the essential disciplines and practices which lead to a true realisation of Nibbāna. When pressed for further descriptions and explanations Buddha remained silent.

It may be that some Great Intelligence lies behind the workings of *kamma* (i.e. *kamma-vipāka*) and that “*kamma*” is only a word which describes the manner in which this Great Being operates. But in Buddhism reality is experience and beyond experience there can be no

absolute certainty. While we all experience the workings of kamma (assuming that kamma is a valid concept), we have no experience, and therefore no certainty, of an Intelligence which causes it. Also, the very words “great”, “intelligence” and “being” have such strong anthropomorphic implications as to tempt the philosopher immediately into error.

The Buddha’s approach to transcendent existence can be illustrated by imagining a man who has worn a blindfold all his life and thus has no understanding of vision. If such a man attempts to solve his dilemma by meditating upon vision (which is analogous to the mystical approach of meditating on Brahma), he only wastes his efforts. He can repeat in his mind the words “vision”, “colour” and “light.” But such an approach is meditating on words only, for the man has no experience with the reality which these words represent. Similarly, nothing can be gained by asking Vision to come and help (i.e. the devotional approach.) The man may ask many questions about the nature of light, but to try and explain to him is useless; for how can words make a blind person understand vision or appreciate the difference between red and green? They cannot; words will only confuse. (Thus we must also reject the metaphysical approach.) Therefore, the Buddha discussed one thing and one thing only; that is, how to take off the blindfold!

On a certain occasion the Buddha met the follower of another religious teacher and questioned him:

“Well then, Udāyi, what is your own teacher’s doctrine?”

“Our own teacher’s doctrine, venerable sir, says thus: ‘This is the highest splendour! This is the highest splendour!’

“But what is that highest splendour, Udāyi, of which your teacher’s doctrine speaks?”

“It is, venerable sir, a splendour greater and loftier than which there is none. That is the Highest Splendour.”

“But, Udayi, what is that Splendour greater and loftier than which there is none?”

“It is, venerable sir, that Highest Splendour greater and loftier than which there is none.”

“For a long time, Udāyi, you can continue in this way, saying, ‘A splendour greater and loftier than which there is none, that is the Highest Splendour.’ But still you will not have explained that splendour. Suppose a man were to say: ‘I love and desire the most beautiful woman in this land,’ and then he is asked: ‘Good man, that most beautiful woman whom you love and desire, do you know whether she is a lady from nobility or from a Brahman family or from the trader class or Sudra?’ and he replied ‘no.’ Then, good man, do you know her name and that of her clan? Or whether she is tall, short or of middle height, whether she is dark, brunette or golden-skinned, or in what village or town or city she dwells?’ and he replied ‘no.’ And then he is asked: ‘Hence, good man, you love and desire what you neither know nor see?’, and he answers ‘yes.’ What do you think, Udayi, that being so, would not that man’s talk amount to nonsense?”

“Certainly, venerable sir, that being so, that man’s talk would amount to nonsense.”

“But in the same way, you, Udayi, say, ‘A splendour greater and loftier than which there is none, that is the Highest Splendour’, and yet you have not explained that splendour.”³²

In the Tevijja Sutta of the Dīgha Nikāya two young Brahmans fall into disagreement concerning the proper means to achieve union with Brahmā (God.) They take their problem to the Buddha, and part of the dialogue between the Buddha and one of the young Brahmans named Vāseṭṭha is quoted below:

“But yet, Vāseṭṭha, is there a single one of the Brahmans versed in the three Vedas who has ever seen Brahma face to face?”

“No, indeed, Gotama.”

“Or is there then, Vāsetṭha, a single one of the teachers of the Brahmans versed in the three Vedas who has seen Brahma face to face?”

“No, indeed, Gotama.”

“Or is there then, Vāsetṭha, a single one of the Brahmans back to the seventh generation of a teacher’s teacher who has seen Brahma face to face?”

“No, indeed, Gotama! ”

“Well then, Vāsetṭha, those ancient Rishis of the Brahmans versed in the Three Vedas, the authors of the verses, the utterers of the verses, whose ancient form the words so chanted, uttered or composed, the Brahmans of today chant over again or repeat; intoning or reciting exactly as has been intoned or recited—to wit, Atthaka, Vāmaka, Vāmadeva, Vessāmitta, Yamataggi, Aṅgīrasa, Bhāradvāja, Vāsetṭha, Kassapa, and Bhagu—did even they speak thus, saying: ‘We know it, we have seen it, where Brahma is, whence Brahma is, whither Brahma is?’ ”

“Not so, Gotama! ”

“Then you say, Vāsetṭha, that none of the Brahmans, or of their teachers, or of their pupils, even back to the seventh generation of a teacher’s teacher has ever seen Brahma face to face. And that even the Rishis of old, the authors and utterers of the verses, of the ancient form of words which the Brahmans of today so carefully intone and recite precisely as they have been handed down—even they did not pretend to know or to have seen where or whence or whither Brahma is. So that the Brahmans versed in the Three Vedas have forsooth said thus: ‘What we know not, what we have not seen, to a state of union with that, we can show the way, and can say: ‘This is the straight path, this is the direct way which makes for salvation, and leads him, who acts according to it, into a state of union with Brahma!’ Now what think you, Vāsetṭha? Does it not follow, this being so, that the talk of the Brahmans, versed though they be in the Three Vedas, turns out to be foolish talk?”

“In truth, Gotama, that being so, it follows that the talk of the Brahmans versed in the Three Vedas is foolish talk.”

“Verily, Vāsetṭha, that Brahmans versed in the Three Vedas should be able to show the way to a state of union with that which they do not know, neither have seen—such a condition of things can in no wise be. Just, Vāsetṭha, as when a string of blind men are clinging one to the other, neither can the foremost see, nor can the middle one see, nor can the hindmost see—just even so, methinks, Vāsetṭha, is the talk of the Brahmans versed in the Three Vedas but blind talk: the first sees not, the middle one sees not, nor can the latest see. The talk then of these Brahmans versed in the Three Vedas turns out to be ridiculous, mere words, a vain and empty thing.”

Experiencing God

There is an emotional as well as a logical aspect to one’s belief in God. Despite the very critical analysis of the possible existence of God which I have stated above, I sometimes experience a strong feeling of the existence and presence of something transcendent, infinite, eternal and good; something which can influence my own destiny and the destiny of all creation. An attempt at describing this felt something would come close to the Chinese concept of Tao. Most often this occurs spontaneously during periods of solitude in forest or desert.

This is a very beautiful feeling, a very wholesome and wonderful feeling, and therefore I do not repress it or dismiss it as “unscientific.” Rather I welcome it and seek to cultivate it, and on rare moments when I feel so inclined I am not too proud to hope for its guidance and honour its grandeurs. Whether this is anything more than a feeling, I do not know. I like to

think that it has some existence apart from my own moods, but I cannot be sure. I cannot believe simply for the comfort of believing. But from the Buddhist position, it matters little whether such a feeling has external reality; what is most significant and what is certain is the experience itself.

What I do know, however, is that much suffering exists in the world and that mankind, should it ever choose to end its bigotry, jealousy and egotistical feuding, has the power to end this suffering. I also know that this can only happen when man improves himself on an individual level by looking at the repressed and ugly aspects of his psyche and expending the necessary time and effort to remedy these aberrations. Of all the great religions, only Buddhism tells how this can be done; in fact such is the major concern and emphasis of the Buddha's teachings. God (assuming there is a God) will not cure us of addictions and passions which we do not wish to relinquish or of fears and insecurities which we do not wish to confront. We simply will not let him! Mysticism is no substitute for psychotherapy.

Part III

Buddhism and Science

Buddhist writers have often remarked that Buddhism is the one religion which has no quarrel with science and that the Buddha anticipated some of our modern scientific theories by nearly 2,500 years. While this is largely true, there are nevertheless several aspects of Buddhist teachings which contemporary science either does not recognise or completely rejects. For convenience of discussion I should like to divide arbitrarily the relationship of Buddhism to science into five categories: 1) Areas of complete agreement; 2) Buddhist concepts not recognised by science; 3) Buddhist teachings similar but not identical to those of science; 4) The Buddhist view of the mind; 5) Buddhist doctrines rejected by science.

As with the rest of this writing, our discussion of Buddhism shall be confined to Theravāda Buddhism, which is the earliest form and is based upon the Pāli writings. With the possible exception of Zen and a few other sects, the Mahāyāna or Sanskrit schools of Buddhism bear less similarity to scientific teachings than does Theravāda. In the Mahāyāna writings one finds examples of deification of the Buddha; a doctrine of salvation through faith which leads to rebirth in the Western Heaven; and an emphasis upon magic, miracles and supernatural beings which excels anything of similar nature in the Pāli writings. Also in the Mahāyāna are emphases upon devotion, ritual, esoteric teachings, metaphysics and mysticism, all of which are virtually unknown in both science and the Pāli Canon. These features are not characteristic of all Mahāyāna schools, however, and the division of Mahāyāna into numerous and varied sects prohibits in this writing a thorough analysis of its relationship to science.

The Agreements between Buddhism and Science

It is in the areas of ideals and general principles, rather than specific beliefs, that Buddhism and science bear their greatest similarities. Both advocate free and rational inquiry, empirical verification and freedom from authoritarian dogma. Both view the universe as regulated by impersonal laws of cause and effect operating throughout aeons of time. Both see man as a product of the universe rather than a special creation.

Impermanence and Cause and Effect

One of the basic tenets of Buddhist doctrine is the three signata, or three essential characteristics of existence. The first of these is *anicca* or impermanence, which states that all things in the universe are subject to change. No finite creation can exist forever, whether it be man or animal, city or society, mountain or solar system. Throughout the Pāli Canon is the Buddha's oft-repeated stanza:

“All compounded things indeed
are subject to arising and passing away;
what is born comes to an end.”³³

And again he spoke:

“Behold, Ānanda, how all these things are now dead and gone, have passed and vanished away. Thus impermanent, Ānanda are component things.”³⁴

Or more concisely he said:

“Whatever has origin, all that is subject to cessation.”³⁵

This process of change, however, does not occur chaotically, but rather is universally regulated by impersonal laws of cause and effect. It is only the laws of change which do not change. Thus another essential tenet of Buddhist doctrine is *patīccasamuppāda*, or dependent

origination, which states that each existing condition is determined by the conditions which preceded it. In the Buddha's words:

"This basic principle stands firm, this universal conformity to law, the conditioning of one thing by another."³⁶

"Profound is this law of dependent origination. Since it does not now know, understand or grasp this law, this generation has become confused, like a ball of thread."³⁷

"The noble disciple thoroughly and systematically gives his mind to the Causal Law, thus: This being, that comes to be; this not being, that does not come to be. From the arising of this, that arises; from the ceasing of this, that ceases."³⁸

The Infinity of Time

There is in Buddhist teaching no beginning and no end of the universe. The above-mentioned laws of cause and effect have been operating back into the infinite past and will continue to operate into the infinite future.

"Now a certain bhikkhu came to the Buddha ... Seated at one side he said this to the Exalted One: How long, Lord, is an aeon (i.e. a world-cycle, the period between the arising and cessation of a world.)?"

"Long, bhikkhu, is an aeon. It is not easy to reckon how long by saying so many years, so many centuries, so many thousand centuries."

"Can it be told, Lord, by a parable?"

"It can, bhikkhu, said the Exalted One. Just as if there were a mighty mountain crag one *yojana* (i.e. about seven miles) in length, breadth, and height, without crack or cranny, not hollowed out, one solid mass of rock, and a man should come at the end of every century, and with a fine cloth of Kāsi should once on each occasion stroke that rock: sooner would that mighty mountain crag be worn away by this method, sooner used up, than an aeon. Thus long is an aeon: of aeons thus long many an aeon has passed away, many a hundred aeons the beginning, brother, of this faring on. The earliest point is not revealed of the running on...", many a thousand aeons, many a hundred thousand aeons. How is this? Incalculable is the beginning, brother, of this faring on. The earliest point is not revealed of the running on."³⁹

Man is not a Special Creation

In the Buddhist view man is a product of an impersonal universe. The universe was not created for man, nor is man necessarily the highest form of intelligence. Nor does Buddhism recognise any essential difference between man and the lower animals; the difference is qualitative rather than absolute.⁴⁰

Free and Rational Inquiry

Perhaps the greatest appeal that Buddhism has to the scientific mentality is its insistence upon rational inquiry and critical examination, as opposed to blind faith and devotion. In the *Aṭṭhakavagga* of the *Sutta Nipāta* the Buddha is quoted:

"It is certainly hard to change one's set opinions, but a man should let himself freely test all philosophical systems, adopting and rejecting them as he sees fit."⁴¹

On another occasion, when asked how to determine a true doctrine, he replied:

"Do not go upon what has been acquired by repeated hearing; nor upon tradition; nor upon rumour; nor upon what is in a scripture; nor upon surmise; nor upon an axiom; nor upon specious reasoning; nor upon a bias towards a notion that has been pondered

over; nor upon another's seeming ability; nor upon the consideration, 'The monk is our teacher.'" ⁴²

Even his own doctrine was not excluded from critical investigation. In a Tibetan text he is quoted:

"One must not accept my teaching from reverence but first try it as gold is tried by fire."⁴³

And again he addressed his followers:

"If, now knowing this and perceiving this, would you say: 'We honour our Master and through respect for him we respect what he teaches?'"

"No, Lord", replied the monks.

"That which you affirm, O disciples, is it not only that which you yourselves have recognised, seen and grasped?"

"Yes," they answered.⁴⁴

The Buddhist criteria for determining objective truth are twofold. First, a belief must be consistent within itself, i.e. free from contradictions.⁴⁵ As the Buddha stated, "Truth is one and without a second."⁴⁶ But it is possible to have a doctrine consistent within itself and yet not corresponding to fact. Thus the Buddha said that convictions should not be founded on pure reasoning lest they vary from reality. This brings us to the second criterion which is that a belief must be demonstrable within the light of one's experience, i.e. it must be capable of empirical verification.⁴⁷

For example, many Brahmans religiously and metaphysically contended that God had established the caste system, and thus it was divinely willed that men should be divided into four distinct social strata. The Buddha in opposition to the caste system countered these arguments by pointing out that in certain Persian states there were only two classes, the lords and the serfs, and even this was not rigid for, "sometimes the lords became serfs and the serfs lords." And again when the Brahmans asserted that they were a divine race born from the mouth of God, the Buddha replied that the Brahman women are seen to, "have their seasons to conceive, to give birth and to give suck" like people of any other race.⁴⁸

With regard to these scientific features of the *Dhamma*, one of the most renowned scientists of all time, Dr. Albert Einstein, made the following statements:

"The religion of the future will be a cosmic religion. It should transcend a personal God and avoid dogmas and theology. Covering both the natural and the spiritual, it should be based on a religious sense arising from the experience of all things, natural and spiritual, as a meaningful unity. Buddhism answers this description."

"If there is any religion that would cope with modern scientific needs it would be Buddhism."⁴⁹

Buddhist Concepts not Recognised by Science

The existence of the transcendent realm of Nibbāna and the concept of the impersonal law of moral or psychological cause and effect called kamma (*kamma-vipāka*) are two important Buddhist doctrines which do not occur in accepted scientific teachings. In no way do these two concepts challenge our present scientific theories or contradict recorded facts. Nibbāna by its very definition is beyond the realm of scientific inquiry (see the "Pragmatic and Empirical" section above), and kamma is a postulated law of nature which, as yet, is unsupported by recorded facts. Therefore, from the scientist's viewpoint, both concepts are purely hypothetical and lack objective support.

However, it should not be assumed that because they are scientifically unverifiable, the doctrines of Nibbāna and kamma contradict the Buddhist ideal of empirical verification. The Buddhist disciplines of psychological development are alleged to result in an expansion of one's mental faculties to such a degree that knowledge can be acquired by extrasensory means. And it was on this basis that the Buddha claimed to know of kamma and Nibbāna. Regarding this matter he is quoted:

“It is just like a man blind from birth who could not see black or white, blue or yellow, or red or pink things, who could not see level or rough ground, the stars, or the sun and moon, and who should affirm that there are no such things, and that no one could see them—on the ground forsooth that, as he himself had no knowledge or vision of them, therefore they were non-existent. In so saying would he say aright?”

“No, Gotama.”

“These things do exist and there are those who can see them; and consequently he would be wrong in saying they were non-existent merely because he could not see them.”⁵⁰

Teachings Similar but not Identical

Not only did the Buddha refrain from discussing metaphysical problems which defied empirical verification. He also advised his disciples to avoid preoccupation with questions about the origins and structure of the universe; for these matters, too, are irrelevant to the immediate problems of selfishness, suffering and psychological maturation. However, in a few sections of the Pāli Canon he saw fit to mention matters of scientific concern, and from these we can gain some knowledge of his views of the universe. Usually these passages were intended to illustrate a point of moral or psychological significance rather than to appease curiosity. For example, one of his descriptions of the end of the world was given to emphasise that all things, including the earth itself, are impermanent and will perish.

Cosmology

According to astronomers, our solar system is only one of approximately 100 billion solar systems or stars which are grouped into a great disk-shaped arrangement known as a galaxy. At least 100 million other galaxies, and perhaps as many as a billion, occur within the range of our largest telescopes. Each galaxy contains from several million to over 2,000 billion stars. Within most galaxies stars are not distributed in random order, but rather many are arranged into clusters. Our own galaxy has more than 100 such intra-galactic clusters, and each cluster has from a few thousand to a million stars.⁵¹ Not only are stars arranged into intra-galactic clusters and these clusters into galaxies; most galaxies, themselves, are arranged into clusters. Our galaxy is one of a cluster of at least 18 others, and some clusters of galaxies (such as the Virgo cloud and the Coma cluster) contain upwards of 1,000 visible galaxies.⁵²

The Buddhist view is remarkably similar. According to the Buddha, our world is not unique. Countless other world systems such as our own are suspended throughout space. In his own words:

“As far as these suns and moons revolve shedding their light in space, so far extends the thousand-fold world system. In it are a thousand moons, a thousand suns, a thousand of the Southern Continents ... (then follows a list of thousand-fold divisions of what at that time were the major geographical areas of the known world—the four continents and the four oceans and a thousand-fold division of the system of deva worlds. See below “The Existence of Devas” section.) ... This is the thousand-fold minor world-system. A thousand times such a thousand-fold minor world-system is the twice-a-thousand middling world-system. A thousand times such a twice-a-thousand middling world-system is the thrice-a-thousand major world-system.”⁵³

Scientists readily accept the existence of other solar systems, but the assertion that each solar system contains a planet which has the same or similar major continents and oceans as our own seems quite unlikely. Also, 1000 X 1000 X 1000 equals one billion, which is only 1% the estimated size of our own galaxy. Some have claimed that the Buddha was speaking only of the inhabited solar systems and ignoring the others. But aside from these two discrepancies and the possible implication that the moon radiates its own light, the picture is remarkably modern. A similar quotation from the Buddha is found in Anguttara-Nikāya V, 59-60.

In addition, the Buddha did not visualise a static universe. He taught instead that solar systems continually deteriorate and die out, while new ones are in the process of evolving. This view, also, is in accordance with modern science.

The Destruction of the Earth

Having unlocked the mysteries of solar energy and noting the stages of stellar evolution, astronomers have thus predicted the manner in which the world will end. They say that most likely the sun slowly but steadily will increase in brightness for a period of about five billion years at which time the temperature of the earth will be near the boiling point of water. Following this the increase in brightness will develop at a much faster rate. The sun will then expand to some 200 or 300 times its present size, which will be sufficient to engulf the planets Mercury and Venus and possibly the earth as well. But whether the earth is actually engulfed or not is immaterial, for the heat of the sun at this stage will be sufficient to vaporise our entire planet!⁵⁴

On one occasion the Buddha said:

“There will come a time when the mighty ocean will dry up, vanish, and be no more ... There will come a time when the mighty earth will be devoured by fire, perish, and be no more.”⁵⁵

On another occasion he gave a more detailed description, but one which varies from the scientific version:

“There will come a time, Brethren, may be hundreds of thousands of years hence, when no more rains will fall and consequently all plants and trees, all vegetation, will dry up and be destroyed. With the scorching due to the appearance of a second sun, streams and rivulets will go dry; and with the appearance of a third such large rivers as the Ganges and Jamma will dry up. ... (Similarly, the lakes and oceans will dry up as a total of six suns appear in the sky. Then with the appearance of a seventh and final sun:) ...When the seventh sun appears, this earth and Sineru, greatest of mountains, will burst into flames, will blaze up and become a single sheet of flame ... as it blazes and burns, vanquished and overwhelmed by the vastness of the fiery mass, it crumbles away. Out of the blaze and the burn of the great earth and Mount Sineru, there is neither cinder nor ash to be found. Monks, just as out of blazing, burning ghee or oil no cinder or ash is found; even so, monks, out of the blaze and burn of the great earth and Mt. Sineru neither cinder nor ash is to be found.”⁵⁶

It is, however, scientifically possible that the world will end in a manner similar to that described in the latter quotation. This would occur if our solar system were to collide with another. About 80% of all known stars are not single stars like our own but rather occur as multiple stars (usually double stars or binaries.)⁵⁷ Consequently, the probability of three suns appearing in such a solar collision would be greater than the probability of only two. Also, multiple systems of three and four stars are not rare, and at least one multiple system of six stars is known (i.e. the Castor system in Gemini.)⁵⁸ However, the probability of our Solar system colliding with a six-star multiple system is extremely remote.

The Structure of Matter

It was a common belief during the Buddha's time that the world was made up of four primary elements—earth, water, fire and air. As this concept became incorporated into Buddhism it appears to have acquired two levels of usage. In one sense it retained pretty much its original meaning, as noted in the Mahā Rahulovāda Sutta. Here the Buddha describes all the solid parts of one's body as being composed of “the element of earth” just like solid objects outside the body, the warm or hot aspects of one's body as being “the fiery element” just like external heat. And likewise for water and air. The purpose of this passage was to illustrate that the body or the self is compounded and has no eternal substance. Thus, in this case the Buddha made use of a popular belief to illustrate a significant truth regarding the nature of man. If we give this passage a literal interpretation, then scientifically it must be evaluated as a primitive theory of chemistry which in principle is sound but only crudely approximates our modern concept of elements.

However, more commonly in the Dhamma the terms earth, water, fire and air are rendered as—solidity or extension, cohesion, heat and motion respectively, and the term

“primary qualities” is often used in place of the word “elements.”⁵⁹ The Visuddhimagga further elaborates upon this by explaining that the four are interdependent and do not exist apart from one another.⁶⁰ In the light of modern physics one could easily rationalise such a doctrine by interpreting solidity as matter, cohesion as gravitational and electromagnetic force, heat as energy and motion as motion. This in fact would include the basic features of physical existence. However, we must beware of the tendency to give familiar interpretations to unfamiliar material. Superficial similarities can deceive us into projecting our own understandings into the beliefs of a completely different culture and era.

There remains one final aspect of the early Buddhist view of the structure of matter. This appears in the *Vibhanga Atthakathā* 343, and apparently was not proclaimed by the Buddha himself. According to this text, matter is composed of minute particles which are so small as to be imperceptible to the eye. The smallest of these atoms is termed the *param-anu* and it is stated that 581, 147, 136 of these are required to make one fingerbreadth. Assuming 20 millimetres to be an average finger breadth, then this smallest particle has a diameter of 0.345 Ṣ.⁶¹ Science recognises hydrogen as the smallest and most abundant atom and measures its most probable diameter as 1.058 Ṣ and its effective diameter as about 2.0 Ṣ. Thus the discrepancy between the Buddhist and scientific measurements ranges between a factor of three and a factor of six. Considering that we are dealing with factors of several hundred million, the correlation is nothing short of amazing!

Evolution

The Brahman caste was (and still is) the highest in India. On one occasion a young Brahman, named Vāseṭṭha, joined the Buddhist order and thereby became a monk of equal status with men from lower castes. For this he was severely reprimanded by other Brahmans. They said that he had forsaken a divine and holy order; that the Brahmans were a special race born from the mouth of God. To repudiate these contentions the Buddha explained to Vāseṭṭha the true origins of humanity and said that all men had a common ancestry. This discourse is recorded in the *Aggañña Sutta*.⁶²

It cannot be said that the *Aggañña Sutta* describes evolution in the Darwinian sense. It makes no specific mention of biological adaptation, competition and survival of the fittest. Yet some striking similarities occur: The first beings on earth are described as sexless, vaguely-shaped creatures whose bodies lack solidity. In the beginning they feed upon a savoury earth which first appears as a scum on the ocean surface. This continues for a great length of time during which their bodies increase in solidity, and diversity begins to appear in their shapes:

“Now those beings, Vāseṭṭha, feasting on the savoury earth, feeding on it, nourished by it, continued thus for a long, long while. And in measure as they thus fed, did their bodies become solid, and did variety in their comeliness become manifest. Some beings were well-favoured, some were ill-favoured.”

With the disappearance of the savoury earth, growths similar to mushrooms appeared in the soil, and the earth’s inhabitants fed upon these. After these vanished, creeping plants became the source of nourishment and finally rice. All this is said to have required great periods of time and eventually sexual characteristics developed:

“Then those beings feasting on this rice in the clearings, feeding on it, nourished by it, so continued for a long, long while. And in measure as they, thus feeding, went on existing, so did the bodies of those beings become even more solid, and the divergence in their comeliness more pronounced. In the female appeared the distinctive features of the female, in the male those of the male.”

Following this the words “man” and “woman” and later “people” make their first appearance in the *sutta* with regards to the creatures under discussion. The word “beings”, however, continues to be used and occurs more often, though interchangeably, with the words denoting humanity.

In time these beings take to making huts, and following this they learn to store up rice instead of obtaining daily rice supplies. Eventually the supply of this food, also, becomes scarce. At this point they divide the land among themselves so that each has his own property. But with the establishment of property, theft arises followed by punishment and the eventual choosing of a ruler to administer justice. Following this a class of nobles appears, and finally division of labour occurs with the development of various trades.

Thus in the Aggañña Sutta we find several features of modern evolutionary theory: The principle of gradual change over great lengths of time, the continuous development of diversified forms, and asexuality preceding sexual differentiation are all clearly stated. Furthermore, the development of plants in the sequence of scum, fungi, creepers and rice is a reasonable approximation of botanical evolution. And the description of the building of huts followed in succession by the establishment of property, law, government and division of labour is supported by contemporary historical and anthropological data. No mention of animals *per se* is found in the sutta, and it is safe to assume that the beings under discussion were regarded as being both animals and men. For the word "beings" in Buddhist writings refers to all creatures human or otherwise, and, as stated above, Buddhism recognises no essential difference between man and animals. Consequently, the evolution described in the Aggañña Sutta would result in fossil impressions like those known to paleontologists.

Finally, the Buddha's description of the primordial world at the very beginning of evolution is compatible with some modern versions:

"Now at that time, all had become one world of water, dark, and of darkness that maketh blind. No moon or sun appeared, no stars were seen, nor constellations, neither was night manifest nor day, neither months nor half-months, neither years nor seasons, neither female nor male. Beings were reckoned just as beings only. And to those beings, Vāseṭṭha, sooner or later after a long time, earth with its savour was spread out in the waters. Even as a scum forms on the surface of boiled milky rice that is cooling, so did the earth appear. It became endowed with colour, with odour, and with taste."

However, much is left unmentioned in the Aggañña Sutta, and it is not possible to evaluate fully the Buddha's agreement with Darwinian theory on the basis of this text alone. The first mention of sexual differentiation in the text occurs after the appearance of rice, while, scientifically, sexual differentiation is known to have originated several hundred million years before rice or any other grain came into existence. But the wording of the sutta implies that sexual differentiation was already in existence before this time and that it was sexual dimorphism (i.e. different physical appearances between the sexes) which manifested after the occurrence of rice; and even this is only suggested by the wording rather than being precisely stated. Furthermore, no mention is made of wheat, millet, fruits and other foods besides rice, but here we must keep in mind that the purpose of the sutta was to explain to Vāseṭṭha his own racial and cultural origins and not to digress into historical data irrelevant to his immediate spiritual and psychological problems. Again, the sutta conveys the impression of a strictly herbivorous diet for all species throughout all evolution until mention is made of the establishment of hunters at the time of division of labour. This very much contradicts the established facts of palaeontology, zoology, archaeology and anthropology. But again the sutta does not deny the existence of meat eating; it simply makes no mention of it. As an account of the origins of man and society, the Aggañña Sutta must therefore be described as greatly over-simplified. Yet it was no doubt adequate for the purpose for which it was intended.

But despite all of the above, there is one major feature of the sutta which is completely at variance with orthodox science, so much so in fact as to discourage sympathetic consideration from scientifically-oriented readers. That is, the sutta does not recognise a gradual evolution of consciousness and other mental faculties. Rather it describes the inhabitants of earth as being fully endowed with consciousness, intelligence, moral awareness and verbal communication from the very beginning of evolution.

It is true that recent studies of baboon and chimpanzee societies have revealed them to be more sophisticated than previously suspected. It is also true that the ability to communicate information and the establishment of territorial rights exist in such lowly creatures as fish, octopus and insects; and furthermore it is true that people who have worked intimately with animals of all types have often testified that their faculties of responding, feeling, conceptualising and communicating are greater than usually realised. But however much we may attribute to the lower members of the animal kingdom, it is doubtful that any reputable scientist would give serious consideration to such statements as:

"There comes also a time, Vāseṭṭha, when sooner or later this world begins to re-evolve. When this happens, beings who de cease from the World of Radiance, usually come (i.e. are reborn) in this world. And they become made of mind, feeding on rapture, self-

luminous, traversing the air, continuing in glory, and remain thus for a long, long period of time.”

And again in the early stages of evolution when beings are still feeding on savoury earth :

“And herein they that were well favoured despised them that were ill favoured, thinking: We are more comely than they; they are worse favoured than we. And while they through pride in their beauty thus became vain and conceited, the savoury earth disappeared. At the disappearance of the savoury earth, they gathered themselves together and bewailed it: Alas for the savour! Alas for the savour! Even so now when men having gotten a good savour say: Ah, the savour of it! Ah, the savour of it, they do but follow an ancient primordial saying, not recognising the significance thereof.”

Thus from the position of modern science, the Aggañña Sutta must be described as an interesting mixture of mythology, occultism and scientific concepts.

A passage from a sutta in the Saṃyutta Nikāya tells of the antiquity of biological origins:

“Incalculable is the beginning, bhikkhus, of this faring on. The earliest point is not revealed of the running on, the faring on, of beings cloaked in ignorance, tied to craving. If a man, bhikkhus, were to prune out the grasses, sticks, boughs and twigs in this India and collecting them together, should make a pile laying them in a stack of squares saying for each: ‘This is my mother; this is my mother’s mother, etc.’ Brethren, the grasses, sticks, boughs, twigs in this India would be used up, ended before the mothers of that man’s mother were to come to an end.”⁶³

The Source of the Teachings

Despite the discrepancies between the scientific and Buddhist versions of cosmology, the structure of matter, and evolution one cannot help but ponder their marked similarities. Consequently the question arises, “How was such accuracy possible?”

Since the Buddha and his followers had no access to scientific data nor conducted any scientific investigations, the explanation most acceptable to educated Westerners is that such teachings were a series of fortunate guesses. Acknowledging that the Buddha was perspicacious enough to realise that the universe was eternally changing and regulated by impersonal laws of cause and effect, and that he was imaginative enough to conceive of the vastness of time and space, then it would not be surprising that his explanations of cosmology, the origin of life, etc. would bear some similarities to reality. This is not an unreasonable conclusion and may well be valid.

On the other hand, orthodox Buddhists can raise two objections to this explanation: First, among all of the many other ancient philosophers and sages (Hindu, Hebrew, Greek, Egyptian, etc.) not one of them came nearly as close to so many different scientific teachings as did the Buddha. This strongly implies a factor beyond that of chance. Secondly, doctrines founded upon speculations and hearsay would be violations of the Buddha’s own ideals of empirical verification, teaching only what one knows to be true and of avoiding conclusions founded on specious reasoning. Throughout his life the Buddha was noted for fully adhering to all of the virtues he advocated. The Buddhist explanation of the similarities between the Dhamma and science is that the Buddha by virtue of realising Nibbāna and developing his psychic faculties acquired this information by extrasensory means similar to clairvoyance, precognition and remembering the distant past.

If this explains the similarities, how can a Buddhist account for the discrepancies? He has five possible choices:

1. He can take the position of extreme orthodoxy, accepting the Dhamma as infallible and rejecting science. This response is not only naive and philosophically dangerous; it is also extremely un-Buddhist; for it violates the Buddhist principles of non-prejudice, critical examination and accepting only those teachings which are founded on knowledge.

2. He can claim that those passages of scripture which conflict with science are actually symbolic or figurative and not to be interpreted literally. This explanation may well apply in many instances, but if one arbitrarily classifies all embarrassing passages as symbolic, he makes the same mistake and invites the same dilemma that is often encountered by liberal

Christians. That is, one progresses further and further into reinterpretation and rationalisation to avoid facing unpleasant conclusions. If one decides that a certain clearly stated passage is symbolic, why could not the same be said for any other passage? The ultimate result is either total uncertainty or else accepting only those passages which are compatible with one's personal opinions.

3. He can claim that the Buddha was completely correct in his teachings, but that there have been distortions and alterations in recording the Dhamma so that the existing scriptures are not entirely accurate. There is some merit to this contention, and we shall examine it in further detail later.

4. He can claim that while the Buddha did have profound insights, these nevertheless had their limitations, and therefore he fell into error on occasion. Though this may appear blasphemous to some Buddhists, we have no certainty that the Buddha was immune to error. An unconditional assertion that the Buddha was infallible would demand either prejudice or blind faith, both of which are un-Buddhist. More important perhaps is that such an assertion of infallibility would display either insecurity or a lack of mental development. The Dhamma claims that its essential tenets, the fruits of mental development, are capable of verification within the light of one's own experience. And one who has made reasonable progress along the Eightfold Path finds this to be so. Arguments and faith are unnecessary.

5. Finally, and perhaps most in accordance with Buddhist principles, he can suspend judgement on such matters. This is warranted on two considerations. First, epistemologically it can be demonstrated that the validity of any world view, whether Buddhist, scientific, Christian, or otherwise, can never be established with absolute certainty.⁶⁴ Thus opinions on such matters are always subject to some margin of doubt. Secondly, as the Buddha himself stated, questions of the nature and origin of the world are irrelevant to the more important problems of happiness, everyday living and spiritual development, and therefore they are not the primary concern of the Dhamma.⁶⁵ In fact, he discouraged preoccupation with such matters.

The Nature of the Mind

Starting with the premise that there can be no such thing as experience without mind or consciousness?, it follows that all human experience, both subjective and objective, is largely a psychological occurrence. Consequently, from the Buddhist viewpoint any notion of existence apart from human experience has little significance. And conversely, any notion of a self, ego or personality apart from experience is meaningless. For this reason Buddhism is first and foremost a psychological system, and its primary concern is the development and improvement of the human mind.

The Buddhist approach to the mind is predominantly empirical and experiential rather than conceptual or theoretical. For example, the Buddha spoke mainly of sensations, perceptions, love, hate, fear, etc. In contrast, Sigmund Freud more often spoke of id, ego, superego and libido, and today neurophysiologists talk about macromolecules, inhibitory impulses and neuronal discharges. Here we see three separate approaches to the same phenomenon. Each can be valid on its own level without necessarily contradicting the others. The major emphasis of the Dhamma is the manner in which one experiences and responds to sensations, perceptions, thoughts and emotions. Its goal is teaching the individual to minimise unpleasant experiences (fear, anger, anxiety, depression, etc.) and to enhance experiences which are truly wholesome and meaningful.

In addition to his experiential emphasis, the Buddha also taught several concepts regarding the nature of the mind. And on this level a comparison between Buddhist and Western psychology can best be made. Also, following the death of the Buddha the conceptual approach to Buddhist psychology gained increasing popularity resulting in the voluminous writings of the *Abhidhamma* and other texts.

These later Theravāda writings are consistent with the earlier canonical sources, but their authors occasionally enlarged upon the earlier writings, gave their own interpretations to ambiguous passages and introduced new concepts. It is sometimes important for the reader to distinguish between the allegedly original sayings of the Buddha and his disciples on the one hand, and the later Pāli texts such as the *Abhidhamma*, *Visuddhimagga* and the commentaries on the other hand. For example, the Buddha made no mention in any of the canonical writings as to the physical seat of consciousness. Both Brahmanical scriptures and

popular tradition during the time of the Buddha taught that consciousness originated in the heart. The Buddha neither denied nor affirmed this. However, the writers of the Buddhist commentaries adopted the heart theory, and it found its way into Buddhist tradition.⁶⁶

The most fundamental and frequently mentioned aspect of Buddhist psychology is the doctrine of *anattā* or “no soul.” This teaching is in complete agreement with modern psychology and states that the psyche is an ever-changing aggregate of sensations, perceptions, thoughts and emotions. There is no immortal soul, no true self, no immutable essence which lies at the basis of consciousness. In the words of the Buddha:

“There is no corporeality, no feeling, no perception, no mental formations, no consciousness that is permanent, enduring and lasting, and that, not subject to change, will eternally remain the same.”⁶⁷

“That which is called ‘mind, consciousness, thinking’ arises continuously, during day and night, as one thing, and as something different again it vanishes.”⁶⁸

Another basic tenet of Buddhist psychology is that mind cannot exist independently of matter.⁶⁹ The material and mental aspects of the human personality are considered to be interdependent; neither can come into existence nor survive without the other. In the words of the Buddha:

“What, now, is consciousness? There are six classes of consciousness: consciousness of forms, sounds, odours, tastes, bodily impressions, and of mental objects. This, monks, is called consciousness. From the arising of mind and body, comes the arising of consciousness. From the ceasing of mind and body, comes the ceasing of consciousness.”⁷⁰

“Hence, I say: the arising of consciousness is dependent upon conditions; and without these conditions, no consciousness arises... And upon whatsoever conditions the arising of consciousness is dependent, after these it is called. Consciousness, whose arising depends on the eye and forms, is called ‘eye-consciousness.’ Consciousness, whose arising depends on the ear and sounds, is called ‘ear-consciousness..... (likewise for odours, tastes, bodily contacts and mind objects.)”⁷¹

“And it is impossible that any one can explain the passing out of one existence, and the entering into a new existence, or the growth, increase and development of consciousness, independent of corporeality, feeling, perception, and mental formations.”⁷²

The *Visuddhimagga* illustrates this point further:

“For just as when two sheaves of reeds are propped one against the other, each one gives the other consolidating support, and when one falls the other falls, so too, in the five-constituent becoming mentality-materiality occurs as an interdependent state, each of its components giving the other consolidating support, and when one falls owing to death, the other falls too..... Furthermore, mentality has no efficient power; it cannot occur by its own efficient power. It does not eat; it does not drink; it does not speak; it does not adopt postures. And materiality is without efficient power; it cannot occur by its own efficient power. For it has no desire to eat, it has no desire to drink, it has no desire to speak...”⁷³

Not only is consciousness dependent upon matter, Buddhism further teaches that it cannot exist apart from feelings, perceptions, and other states of mind. Conversely, these latter cannot exist without consciousness.⁷⁴ In other words, to have consciousness one must be conscious of something. The oft-spoken term “pure consciousness” has little meaning in a Buddhist context.

This last paragraph, however, warrants a note of explanation regarding the first two of the four immaterial states as taught in Buddhism, i.e. the sphere of unbounded space and the sphere of unbounded consciousness. As with contemplating love, equanimity and the *kasinas*, these two states denote specific meditation subjects and the states of mind produced by such meditations.⁷⁵ That is, the *thought* of unbounded space, etc. is taken as the object of meditation. Therefore, it is doubtful whether such terms should be interpreted as describing the state of mind of the meditator or as representing some metaphysical realm of existence.

Furthermore, they should not be confused with Nibbāna, for they are conceptual formations and as such are subject to the same processes of cause and effect which regulate all other states of mind.⁷⁶ In contemplating unbounded space, for example, one is conscious of the idea or sensation of unbounded space but is not actually experiencing a three-dimensional infinity.

Despite its assertion that mind is dependent upon matter, Buddhism does not go to the materialistic extreme of contemporary science and state that mind is completely and exclusively a mechanistic process (see section: "Materialist View of the Mind".) The Buddha said:

"Truly, if one holds the view that the life principle (*jīva* or soul) is identical with this body, in that case a holy life is not possible; or, if one holds the view that the life principle is something quite different from the body, in that case also the holy life is not possible. Both these two extremes the *Tathāgata* (the Buddha) has avoided, and he has shown the Middle Doctrine ..."⁷⁷

In addition to the physical requirements of consciousness, Buddhism teaches that there is a non-physical aspect of the psyche which is a prerequisite to life, embryonic development and consciousness. An elucidation of this non-physical faculty appears in the *Abhidhamma* and is further explained in the commentaries and the *Visuddhimagga*. It is termed *bhavaṅga-sota* in Pāli, which translates roughly as "subconscious life-stream." The *bhavaṅga-sota* is said to contain the unconscious memory traces of all one's past experience including impressions of past lives.⁷⁸ When one's present body dies, it reappears in a new body. Buddhists, however, carefully distinguish between this phenomena of rebirth and the Hindu concept of reincarnation via an immortal soul. First, they point out that in one lifetime one's personality changes continually from day to day and year to year. An adolescent is markedly different from the person he was as an infant, and an elderly person usually has interests, convictions, desires and memories quite unlike those he held in his youth. Concomitantly, the *bhavaṅga-sota* is continually changing; it is not immortal and is devoid of any eternal essence. Secondly, the *bhavaṅga-sota* alone is devoid of thought and volition. It does not reflect on such considerations as: "I am such and such a person", "I have such and such features", "I recall such and such experiences in my past", "Now I am thirsty", "Tomorrow I shall do thus and so", etc. Consequently it cannot be described as an ego or a true self.

The question, "What is the *bhavaṅga-sota*?" cannot be answered in the same way one might answer such questions as "What is a molecule?" or "What is an arthropod?" The question is much more like asking, "What is a photon (i.e. the substance of light)?" One can say that light is composed of particles, or one can make the contrary statement that light is a wave motion. Upon analysing the physical properties of light, both statements appear to be correct, and yet they are mutually exclusive. This paradox is unresolved and remains an enigma to rational understanding. Yet such a contradiction in no way invalidates the existence of light. This is another example of the difficulties encountered when man attempts to probe the fundamental mysteries of existence. A similar situation exists with the nature of consciousness and life after death.

On this matter the Buddha is quoted:

"To believe that the doer of the deed will be the same as the one who experiences its result (in the next life): this is the one extreme.

To believe that the doer of the deed, and the one who experiences its result, are two different persons: this is the other extreme. Both these extremes the *Tathāgata* has avoided and taught the truth that lies in the middle of both..."⁷⁹

And from the *Visuddhimagga*:

"A mere phenomenon it is, a thing conditioned, that rises in the following existence.

But not from previous life does it transmigrate there. And yet it cannot rise without a previous cause."⁸⁰

King Milinda once inquired of the Venerable Nāgasena:

"What is it, Venerable Sir, that will be reborn?" "A psycho-physical combination, O King."

“But how, Venerable Sir? Is it the same psycho-physical combination as this present one?”

“No, O King. But the present psycho-physical combination produces kammically wholesome and unwholesome volitional activities, and through such kamma a new psycho-physical combination will be reborn.”⁸¹

And again Milinda asks:

“But how, Venerable Sir, can rebirth take place without passing over of anything? Please, illustrate to me this matter.”

“If, O King, a man should light a lamp with the help of another lamp, does in that case the light of the one lamp pass over to the other lamp?”

“No, Venerable Sir.”

“Just so, O King, does rebirth take place without transmigration. Do you remember, sire, when you were a boy learning some verse from a teacher of verses?” “Yes, Venerable Sir.”

“But, sire, does that verse pass over from the teacher?” “No, Venerable Sir.”

“Just so, sire, does rebirth take place without transmigration.”⁸²

An unfortunate aspect of the theory of rebirth is that the Western mentality almost invariably reacts to it with negative emotions, thus precluding any objective consideration. Certainly the doctrine cannot be disproved, and yet one is quite justified in asking what reason there is for considering it. Surprising as it may seem, there is a fairly large body of data which supports this hypothesis. This was discussed in detail in one of our previous writings⁸¹ and is too extensive a matter to be repeated here. Suffice it to say that the evidence is suggestive but not conclusive. Dr. Ian Stevenson, Chairman of the Department of Neurology and Psychiatry at the University of Virginia School of Medicine has made an extensive study of this matter and makes the following conclusions:

“I will say, therefore, that I think reincarnation the most plausible hypothesis for understanding the cases of this series. That is not to say that I think they prove reincarnation either singly or together. Indeed, I am quite sure they do not. But for each of the alternative hypotheses I find objections or shortcomings which make them for me unsuitable explanations of all the cases, although they may apply to some.

“The evidence I have assembled and reviewed does not warrant any firm conclusion about reincarnation. But it does justify, I believe, a much more extensive and more sympathetic study of this hypothesis than it has hitherto received in the West. Further investigation of apparent memories of former incarnations may well establish reincarnation as the most probable explanation of these experiences.”⁸³

The Pleasure-Pain Principle

The most fundamental aspect of the psyche is neither intellect nor memory nor perception; rather it is feeling—feeling in the sense of pursuing what is pleasant and shunning pain (*dukkha*.) Defining pleasure as the entire range of enjoyable experience including happiness, beauty, creativity, love and friendship, then the pleasure-pain principle dominates all life and underlies all motivation. Human beings probably are capable of all the varieties of conscious experience available to the lower animals, and in addition can experience feelings and pleasures, such as artistic appreciation and philosophical contemplations, which are denied to other species. In this sense evolution can be regarded as a continual expansion of the dimensions of individual consciousness.

In Buddhism it is craving, the principle of pleasure seeking, which forms the basis of life. Our continual thirst for new experiences and our desires for repeated sensory and

emotional stimulation motivate virtually all voluntary actions. Without such feelings individual existence would be devoid of purpose, meaning and value. The intellect and the organs of sense perception are merely the instruments through which the pleasure-seeking principle seeks to satisfy its never-ending desires. "Mind precedes all phenomena", said the Buddha, "Mind dominates them and creates them." When craving ceases, rebirth comes to an end.⁸⁴

Mind and Computer

Recently much attention has been given to the development of electronic computers capable of solving all types of intellectual problems. Many psychologists and physiologists have given favourable consideration to the possibility that the human brain operates on the same principle as a computer. Such a hypothesis in no way challenges the Buddhist concept of the mind. Computers may think, but can they feel?

I recall one psychiatric seminar in which computers were under discussion. A computer engineer was asked his view of consciousness, and he replied, "Consciousness is an illusion!" But how can one have an illusion without consciousness? The very word illusion presupposes consciousness.

The Authenticity of the Pāli Canon

To what extent does the Pāli Canon represent the original teachings of the Buddha? In all probability his teachings were not put into writing until the first century B.C., or about 500 years after his death. However, scholars such as Prof. Rhys Davids and others have stated that the suttas and the *Vinaya* were probably completed (though not written) in their present form within a century after the Buddha's demise and certainly were completed before the time of Emperor Asoka (270-230 B.C.)⁸⁵ Dr. Richard Gard believes that the Pāli and Sanskrit schools of Buddhism developed independently and that neither was copied from the other.⁸⁶ If this is true, then most of the Theravāda doctrines are probably authentic, for there is a considerable amount of similarity between the Pāli and early Sanskrit writings. Perhaps the most significant fact to contend their authenticity is the internal consistency of the Pāli scriptures themselves. Though these writings are several times larger than the Bible, contradictions are rare, and the essential teachings of the Four Noble Truths and the other paramount features of the Dhamma are the major theme throughout the entire *Sutta Piṭaka*.

According to Theravāda tradition, a council was held three months after the Buddha's demise at which time all of his discourses were recited. Groups of "reciting monks" were then appointed, and it was the duty of each group to memorise thoroughly specific sections of the Dhamma. On occasions groups which had memorised the same sections would confer with each other as a means of cross-checking and verification.⁸⁷ Thus the oral tradition of Buddhism is said to have been carefully preserved by men of advanced mental discipline until such time as the Dhamma was committed to writing. Such was probably the case. Even today groups of reciting monks still carry on their selected portions of the Dhamma, and occasional monks have committed the entire *Tipiṭaka* to memory! Also, the repetitious style in which the suttas are recorded probably was a device to facilitate memorising. For it is quite unlikely that such repetitions represent the exact wording of unrehearsed dialogues, nor are they any convenience to reading or writing.

This tendency to modify the Buddha's dialogues into repetitious and verbose stanzas gives credence to the assertions of those who claim that the Buddha was correct, and the discrepancies with science have resulted from errors in recording his sayings. For example, let us assume that the Buddha did describe the arrangement of solar systems, galaxies and galactic clusters in the same way as now described by modern astronomy. One can easily see how a quest for rhetorical symmetry and repetition would lead to the descriptions of 1000 X 1000 X 1000 world systems, each like our own, as are now recorded in the *Anguttara Nikāya*. In a similar manner the Buddha stating that the world will end by our solar system colliding with other suns could easily have been modified into the description of seven suns appearing one by one in the sky.

Or again let us suppose that the Buddha did teach evolution of exactly the same sort as taught by Darwin. His disciples were men astute in matters of ethical and spiritual concern

and relatively ignorant of science as we know it today. Consequently, one would expect that the Aggañña Sutta, in which the Buddha describes evolution, would, from the scientific viewpoint, overemphasise the moral and psychological aspects of evolution. And conversely, matters of major concern to modern evolutionary theory would appear relatively unimportant to the early recorders of the Dhamma and thus would become either omitted or inadvertently modified.

But the question we must now answer is: How reliable is a system of oral tradition when extended over a period of several generations? Perhaps the best means of answering this question is to examine a similar situation which existed until recently in the illiterate Polynesian cultures, especially the New Zealand Maori. The Maoris took great pains to memorise accurately tribal histories and genealogies, and consequently their history can be determined with reasonable accuracy for a period of 500 years or more. The consistency between different tribes and the consistency with archaeological findings testify to their reliability. However, the system was not infallible. Tribal discrepancies occur, and the further back one goes into their historical past the more difficult it becomes to distinguish between actual events and tribal mythology. Accounts of magic and miracles occur, and features of Maori history which were not subjects of popular interest were not committed to memory and soon were forgotten.⁸⁸

There is little doubt that some sections of the Pāli Canon are not authentic. For example, in *Samyutta Nikāya* I, 50 (II, 1, 10) we read of an occasion when the demon Rahu attempted to swallow the sun. The sun called to the Buddha for help. The Buddha admonished Rahu, and the sun was set free. This passage can be traced to an ancient Indian myth, which is believed to have originated from the phenomena of solar eclipse.

Another example is the *Lakkhaṇa Sutta*. It is unlike any other and in a few passages contradicts other suttas. Rhys Davids traces its origin to an ancient pre-Buddhist myth, which for some unexplained reason was incorporated into the Canon.⁸⁹ In this writing the Buddha allegedly discusses the 32 marks of the superman. These are 32 anatomical features including a long tongue, 40 teeth and the ability to touch one's knees while standing erect. One who is blessed with all 32 marks will either be a great monarch or a great Buddha, and each mark conveys certain blessings. Though Buddhahood requires celibacy and non-violence, this sutta describes as follows the blessings of a Buddha endowed with the mark of a male organ concealed in a sheath:

“Abundant children will be his, for thousands of children will he have, heroes, champions, vigorous of frame, crushers of the hosts of the enemy.”⁹⁰

The dialogue gives no indication that this or any of the other passages are to be taken symbolically.

The Buddha's first discourse, termed the *Dhammacakkappavattana Sutta*, is consistent with the rest of the Tipiṭaka and also with the alleged historical events in the Buddha's life. Furthermore, its dialogue appears genuine and the message quite reasonable. All seems well until the very end when we read:

“When the Wheel of Truth had thus been set rolling by the Blessed One, the earth-gods raised the cry: ‘At Benares, in the Deer Park at Isipatana, the matchless Wheel of Truth has been set rolling by the Blessed One, not to be stopped by monk or divine or god or death-angel or high divinity or anyone in the world.’

“On hearing the earth gods cry, all the gods in turn in the six paradises took up the cry until it reached the Retinue of High Divinity in the sphere of pure form? And so indeed in that hour, at that moment, the cry soared up to the World of High Divinity, and this ten-thousand-fold world element shook and rocked and quaked, and a great measureless radiance surpassing the very nature of the gods was displayed in the world.”⁹¹

In the *Parābhava Sutta* the Buddha gives a discourse on ethics, and a different ethical discourse appears in the *Mahā-Maṅgala Sutta*. The contents of both appear realistic and acceptable. Nothing in either is objectionable to the Western mentality except that both begin with the same opening paragraph, which reads:

“Now when the night was far spent, a certain deity whose surpassing splendour illuminated the entire Jeta Grove, came to the presence of the Exalted One and, drawing near, respectfully saluted him and stood at one side.”⁹²

While one cannot prove that gods and similar beings do not exist, viewed from the position of modern science their existence appears extremely unlikely, and it seems even more improbable that they would appear and behave in the manner described. The most likely explanation is that in the course of time such opening or concluding passages were added to authentic dialogues. This explanation, however, cannot apply to the *Sakkapañha Sutta*, for the entire sutta, though consistent with Buddhist doctrine and style of writing, is a dialogue between the Buddha and Sakka, the king of the gods.⁹³

As improbable as the existence of gods may seem, it is almost equally improbable to assume that the Buddha was a historical myth. Most likely most passages are authentic while some are not. But we cannot state with absolute certainty which passages belong to which category. How should the modern Buddhist regard this problem? Probably the least desirable course of action would be to try and revise the Dhamma in the light of contemporary opinions. Right or wrong, honesty demands that it stand as it is. Man's conception of the universe has changed markedly in the last 150 years, so it is not impossible that in decades or centuries to come some of the presently "unacceptable" features of Buddhism may be surprisingly modern. Over 2,000 years ago many Buddhists were dissatisfied with the pristine teachings and sought to enlarge and improve upon them. The result was Mahāyāna Buddhism, which today in most schools finds itself at variance with the beliefs and ideals of Western science.

But again we must emphasise two essential features of the Dhamma. First, the Buddha said to examine critically his own teachings, like all other teachings, and to accept only that which is reasonable. Secondly, the most important and most strongly-emphasised aspects of the Buddha's doctrine are its ethical philosophy and the techniques of psychological development. The value of both of these is empirically demonstrable and independent of any world view.

Conflicts between Buddhism and Science

In this section I have listed three areas of disagreement between Buddhism and science. Only with the last of these three does scientific evidence refute the Buddhist claim. The first two could readily be classified under "Buddhist Concepts not Recognised by Science." However, unlike kamma and Nibbāna, these two are of such a nature as to be scientifically distasteful. Thus it is a factor of attitude rather than logic which results in this classification.

The Existence of Devas

In the preceding section it was noted that some of the suttas tell of the appearance of gods as actual historical events in the life of the Buddha. In addition to this, the Buddha himself made frequent reference to such beings. This occurs so often in the suttas that there seems to be little doubt that he did indeed affirm their existence, possibly because such a belief was already deeply-rooted in Indian culture.

In early Buddhism, however, these beings were not gods like those of Greek and Roman mythology. He said that they were not to be worshiped; they were not necessarily superior to humans; and they were not immortal. They were subject to the same laws of cause and effect which apply to earthly existence. According to Buddhism, there exist thirty one planes or dimensions of existence including our own. An intelligent and gifted ruler on one of these planes is called Brahmā or God (the chief god of the pre-Buddhist Brahman tradition), but, as described by the Buddha, he is not a creator, nor is he all-powerful. Rather than trying to abolish the existing Brahman culture, the Buddha dethroned them.

In the *Kevaḍḍha Sutta* the Buddha tells how a monk once became intrigued with the question, "Where do the four basic elements—extension, cohesion, heat and motion—cease, leaving no trace behind?" Through meditation he achieved such a level of consciousness that he entered one of the other planes of existence, the realm of the Four Great Kings. There he asked them his question, but they did not know and referred him to a higher realm, the heaven of the Thirty-Three. From there he was referred to the Yāmā gods and thence to the realm of the Tusitā gods, and so forth until finally he went all the way to the Realm of the Supreme God, Brahmā:

“And he drew near to the gods of the retinue of the greatest god and asked: ‘Where, my friends, do the four basic elements—extension, cohesion, heat and motion—cease leaving no trace behind?’

“And the gods of the retinue of the greatest god replied: ‘We, friend, do not know that. But there is Brahmā, the Great God Almighty, the Supreme One, the one who cannot be conquered by others, All-seeing, All-powerful, the Ruler, the Creator, the Excellent, the Almighty, the One who has already practised Calm, the Father of all and all that are to be! He is more powerful and glorious than we. He will know it.’

“Where, then, is Brahma now?” the monk asked.

“We, friend, do not know where God is, nor why God is, nor whence. But, friend, when the signs of his coming appear, when the light arises and the glory shines, then will he be manifest. For that is the sign of the manifestation of God when the ‘light arises and the glory shines.’

“And it was not long, Kevaddha, before the greatest god became manifest; and that monk drew near to him and said: ‘Where, my friend, do the four basic elements—extension, cohesion, heat and motion—cease, leaving no trace behind?’

“And the greatest god replied to him: ‘I, friend, am the Great God, the Supreme One, the one who cannot be conquered by others, All-seeing, All-powerful, the Ruler, the Creator, the Excellent, the Almighty, the One who has already practised Calm, the Father of all that are and all that are to be!’

“Then that monk answered God and said: ‘I did not ask you, friend, as to whether you were indeed all that you now say you are; but I ask you where do the four basic elements—extension, cohesion, heat and motion—cease, leaving no trace behind?’

“Then again, Kevaddha, God gave the same reply. And that monk yet a third time put the same question to God as before.

“Then, Kevaddha, that greatest god took that monk by the arm and led him aside and said:

“ ‘These gods, the retinue of God Almighty, think me, friend, to be such that there is nothing I cannot see, nothing I have not understood, nothing I have not realised. Therefore I gave no answer to your question in their presence. I do not know, friend, where the four basic elements—extension, cohesion, heat and motion—cease, leaving no trace behind!’”⁹⁴

Authors of science fiction have written about “other dimensions” in which intelligent beings inhabit worlds spatially adjacent to our own but are invisible to us by virtue of being on different planes of existence. This is closer to the Buddhist view than the traditional concept of gods, and perhaps it would be preferable to use the Pāli word “devas” in Buddhist contexts to avoid the usual connotations of the word “gods.”

Occult Powers

As mentioned above (section “The Enigma of the Occult”), carefully-controlled experiments and investigations have indicated that telepathy, precognition and clairvoyance probably are valid phenomena. A few investigators also claim to have demonstrated the existence of psychokinesis, the ability of mind to influence the behaviour of matter; however, the validity of psychokinesis remains open to doubt. Either as a result of these investigations or as a result of personal experiences, most Westerners either believe in such phenomena or at least are willing to give the matter sympathetic consideration. Likewise, Buddhism acknowledges the validity of these occurrences, though it offers no explanation for them.

The question under present consideration, however, is to what extent do such phenomena occur? Recognising that the Buddha had made great strides in psychological development, it is not too difficult to accept those passages where, through extrasensory

means, he is able to know the thoughts of a disciple or know of a discussion that occurred well beyond the normal range of hearing; such passages are not uncommon in the suttas. One may even be able to accept those passages in the Pātika Sutta where the Buddha on separate occasions correctly foretells the death of two Hindu ascetics. But who would believe that portion of the Pātika Sutta where the Buddha in front of several thousand people levitates his body to a height of seven palm trees and then magically creates a flame of equal height?⁹⁵ Accounts of levitation appear on several occasions in the Tipiṭaka. Even more improbable are the occasional passages which list among the possible psychic powers the ability to multiply one's body many times over, to walk on water as if it were ground and to go through solid matter as if it were water.⁹⁶

The extent to which paranormal faculties exist and the extent to which the Buddha had such powers are two questions which may never be answered. But on the basis of the Tipiṭaka alone there is reason to suspect that the Pātika Sutta and similar accounts of mystic wonders are not authentic. First it should be noted that the Buddha made no claim to divinity; he was mortal like all other finite creatures, and on his deathbed spoke, "Decay is inherent in all component things."⁹⁷ In the *Saṅgīti Sutta* he asked Sāriputta to take over the task of lecturing for the night because, "My back is aching; I will stretch it."⁹⁸ And in the *Nandaka Sutta* he addressed a monk: "This discourse, which you preached to the monks, was a long one. My back ached as I stood outside the doorway, waiting for the discourse to end."⁹⁹ It would seem that a man able to multiply his body several-fold, to rise into the air and to float through solid matter could easily spare himself the discomforts of a backache.

In the *Susīmaparibbājaka Sutta* a novice approached several of the advanced monks who had already achieved Nibbāna and asked whether they enjoyed various supernatural powers:

"Do you become many from being one? ... Do you become visible or invisible at will?... Do you float cross-legged through the air just as a winged bird? ... Are you able to transport your body even up to the plane of high heaven?... Do you know the minds of other beings, of other persons, penetrating them with your own mind? ... Do you remember various former births?..."

To each of these questions and many similar ones the monks replied, "No." When the bewildered novice asked how he should take this, the monks said: "O Susīma, we gained freedom through insight wisdom."¹⁰⁰

On another occasion the Buddha was approached as follows:

"The Exalted One was once staying in the mango grove at Nālandā. Kevaḍḍha, a young householder, came to the Exalted One, bowed in homage to him, took a seat on one side and said: 'This Nālandā of ours, Sir, is influential and prosperous, crowded with people devoted to the Exalted One. It would be good if the Exalted One were to order some monk to perform a miracle by supernormal power. Then this Nālandā of ours would become even more devoted to the Exalted One.'

"The Exalted One replied to him: 'But, Kevaḍḍha, I do not give instructions of this sort to the monks: 'Come now, monks, perform a miracle by supernormal power for the white-clad lay-folk!'

Kevaḍḍha then repeated his request and received the same reply. He repeated a third time, and the Buddha said:

"There are three sorts of miracles, Kevaḍḍha, which I, having understood and realised, have made known to others. What are the three? The magical miracle (i.e. the power of mind over matter), the miracle of thought-reading and the miracle of education."

The Buddha then gives a detailed description of the first two and explains that such works will not change the minds of those who do not wish to believe. Regarding such works he concludes:

"Well, Kevaḍḍha, it is because I see danger in the practice of miracles that I loathe and abhor and repudiate them. But what, Kevaḍḍha, is the miracle of education?

"Suppose, Kevaḍḍha, that a monk teaches: 'Reason in this way, do not reason in that way. Consider thus, and not thus. Get rid of this disposition, train yourself and remain in that.'..."

Continuing in this manner, the Buddha shows how through proper training one can eventually achieve enlightenment. He then concludes: "This, Kevaddha, is what is called 'the miracle of education.'" ¹⁰¹

While the Buddha acknowledged the existence of paranormal phenomena, he did not regard them as having positive value and discouraged their use. Among the rules of Vinaya discipline he mentioned. "You are not, O monks, to display before the laity the wonders of *Iddhi*, surpassing the power of ordinary men." ¹⁰² And in the *Aṭṭhaka Vagga* (of the *Suttanipāta*) he said:

"Let him not sleep too much, but remain mindful; let him abstain from sloth, deceit, frivolity, sport, lechery, adornment. Let him not work the spells of the *Atharva Veda*, nor interpret dreams and omens, nor practise astrology. Let not my dear disciple make predictions from the cries of birds." ¹⁰³

The *Brahmajāla Sutta* gives an even more detailed list of the numerous arts of magic, fortune-telling and palmistry which are to be shunned by a Buddhist monk. ¹⁰⁴ Consequently, the authenticity of those passages which tell of the Buddha working miracles in front of the laity is open to doubt. The same might also be said for those which stress occult phenomena beyond the point of mentioning their existence and practical limitations.

Pseudo-history

In the *Cakkavatti-Sihanāda Sutta* the Buddha tells of an era in the distant past when the known world was governed by a dynasty of righteous kings. Each reigned for a period of many thousands of years, and because they lived and ruled in harmony with the Norm of moral law, the world enjoyed peace, prosperity, virtue and happiness. In time, however, there came a monarch who with good intentions sought to rule by his own ideas and in doing so neglected certain needs of the people. Consequently, poverty arose and over several generations was gradually followed, in order, by theft, violence, murder, lying, evil-speaking, adultery, abusive and idle talk, covetousness and ill-will, false opinions, incest, wanton greed, perverted lust and a lack of filial and religious piety. With the appearance of each of these vices the life-span and comeliness of men and women steadily decreased. The Buddha then goes on to say that this process will continue into the future until such time as men become totally devoid of morality and the human life-span has shrunk to ten years:

"The world will fall into promiscuity, like goats and sheep, fowls and swine, dogs and jackals. Among such humans, brethren, keen mutual enmity will become the rule, keen ill-will, keen animosity, passionate, thoughts even of killing, in a mother towards her child, in a child towards its mother, in a father towards his child and a child towards its father; in brother to brother, in brother to sister, in sister to brother."

As a result there will arise a period of wanton destruction and murder. Some people will flee to the mountains and jungles, and when the period of horror is past:

".. coming forth from those dens and fastness and mountain clefts, they will embrace each other, and be of one accord comforting one another, and saying: Hurrah, O mortal, that you still live! What a happy sight to find you still alive!"

Following this will come a moral reformation so that in a period of twelve generations men again live life-spans of 30,000 years and kings again rule according to the Norm of righteousness. Once more peace prosperity and happiness will flourish. ¹⁰⁵ Similar stories appear in other sections of the Pāli Canon.

This sutta can be viewed as a rough approximation of the decline and subsequent restoration of Indian culture, where the present life-span averages about 30 years, and poverty and crime are rampant. At one point in the sutta the Buddha refers to "this India" (*Jambudīpa*) in a context which makes it identical to the culture under discussion. However, even this interpretation is far from historically accurate, and the sutta makes no statement of symbolic intentions. Any literal interpretation must be viewed as scientifically unacceptable. Perhaps we should take the suggestion of Prof. Rhys Davids and regard this writing and the others like it as being on the same level as the *Jātaka* stories; that is, as fairy tales intended to teach a moral rather than historical fact.

Conclusion

In the latter portion of this writing a comparison was made between Western science and the early teachings of Theravāda Buddhism. A remarkable degree of similarity and compatibility was noted; a similarity which is almost astonishing when we consider the antiquity and origins of Buddhism. Yet despite such compatibility, some aspects of the Dhamma are scientifically unacceptable and probably untrue.

How should the modern Buddhist regard this situation? Perhaps the best answer can be found by paraphrasing a passage from the New Testament: "Give unto science those things which are science's, and give unto the Dhamma those which are the Dhamma's." It is the proclaimed province of science to investigate and analyse the physical universe, to discover its laws and to explain its origins. And in this realm no other institution has done so well. The essential and proclaimed province of Buddhism is the realm of experience and feelings, and to date it far surpasses any Western institution in this regard. It is true that there are areas in which the two overlap, and in these areas each can contribute to the other.

The West's emphasis upon the scientific method and its preoccupation with objective reality have sometimes borne unfortunate consequences. Among university students majoring in science and philosophy and also among their professors, one not infrequently finds pathetic examples of brilliant and learned men who have more knowledge of the world than of themselves. They are often emotionally retarded and socially insecure, and frequently deceive themselves into believing that their intellects and extensive knowledge are the highest of virtues. Yet somehow happiness eludes them, and they are forever defending their personal inadequacies behind an *aegis* of titles such as "Scholar", "Doctor" and "Professor." Perhaps even more pathetic and even more obvious are the frequent examples of intelligent but emotionally maladjusted persons who become students (and even authorities) of psychology and psychiatry. Despite their extensive knowledge of psychodynamics and psychotherapy their own personality growth remains minimal. Clearly science alone will not answer life's problems.

On the other hand, the logic of science has strongly refuted the cherished convictions of theistic religions. And in so doing it has further heightened the emotional turmoil of man. The defensive and hostile attitude of many Christians towards science is but one example. Such emotional reactions do not always reflect the Christian desire for a loving father image who will protect, provide and give everlasting life. Quite often they represent another example of the Western emphasis upon external reality. In the minds of many Christians and Jews the God concept is the embodiment of their most noble and cherished ideals; ideals of goodness, virtue and love. To say that God does not exist is thus to say that these ideals have no reality; there is no purpose in living. But such is not the case. Goodness, virtue and love are empirically demonstrable; we can experience them any day of our lives. In effect Western man assumes that to find happiness and meaning in life God must exist as an external reality; he must be "somewhere out there", and further we must *believe* that he is out there. Yet while we do not experience God, believers and unbelievers alike have experienced happiness, goodness and love.

Buddhism, on the other hand, stresses the reality and importance of experience. It is primarily a psychological system with special emphasis given to an experiential approach to the mind. Most important, within this framework it is a system, a technique, a way of life designed to enhance emotional maturity and well-being. In this realm it is unrivalled by any existing institution. And it is here that it holds its greatest potential for making a great and lasting contribution to world culture.

Endnotes

- ¹ *Evolution*. Toronto: International Christian Crusade, 1960.
- ² *Scientific American*, Vol.204, No.3, "Pre-Cambrian Animals", by Martin F. Glaessner. March, 1961, pp.72-78.
- ³ *Science and the Common Understanding*, by J. Robert Oppenheimer. London: Oxford University Press, 1954, pp. 42-43.
- ⁴ *The Universe and Dr. Einstein*, by Lincoln Barnett. New York: New American Library, 1957, pp. 111-112.
- ⁵ *Modern Theories of the Universe*, by James A. Coleman. New York: New American Library, 1963, pp. 161-168.
- ⁶ *Saturday Evening Post*, "How my Comrades Live" Part II, by Joseph Novak. Philadelphia, Pa.: Curtis Publishing Co., May 21, 1960, p. 90.
- ⁷ *Scientific American*, Vol. 208, No. 1, "The Structure of Viruses", by K. W. I-Horne. January, 1963, pp. 48-56.
- ⁸ *The American Institute of Biological Sciences Bulletin*, Vol. IX, No. 1, "Biological Overtones of the Thermal Theory of Biochemical Origins", by Sidney W. Fox. January, 1959, pp. 20-23.
- ⁹ *How Life Began*, by Irving Adler. New York: New American Library, 1957, p. 122.
- ¹⁰ *Scientific American*, Vol. 208, No. 3, "The Genetic Code: II," by Marshall W. Nirenberg. March, 1963, pp. 80-94.
- ¹¹ *Scientific American*, Vol. 205, No. 3, "How Cells Make Molecules," by V. G. Allfrey & A. E. Miksky. September, 1961, p. 76.
- ¹² *Developmental Genetics and Lethal Factors*, by Ernst Hadorn, tr. by Ursula Mittwoch. London: Methuen & Co., 1961, pp. 31-35.
- ¹³ *Introduction to Evolution*, by Paul A. Moody. New York: Harper and Brothers, 1962, pp. 70-72.
- ¹⁴ *SK & F Psychiatric Reporter*, No. 16, "Do Molecules Remember", by Katharine B. Mishler & Joseph P. Coogan. Philadelphia, Pa.: Smith Kline & French Laboratories, September-October, 1964, pp. 3-6.
- ¹⁵ *Scientific American*, Vol. 210, No. 1, "The Great Cerebral Commissure", by R. W. Sperry. January, 1964, pp. 42-52.
- ¹⁶ *Electrical Stimulation of the Brain*, edited by Daniel E. Sheer. Austin: University of Texas Press, 1961, pp. 533-553.
- ¹⁷ *Saturday Evening Post*, "Your Brain and Your Behavior", by Ralph W. Gerard. Philadelphia, Pa.: Curtis Publishing Co., May 30, 1959, p.82.
- ¹⁸ *Western Civilisations*, by Edward McNall Burns. New York: W. W. Norton & Co., 1955, p. 144.
- ¹⁹ *Majjhima Nikāya* I, 515. (No. 76, *Sandaka Sutta*).
- ²⁰ *Psychical Research Today*, by Donald J. West. Baltimore, Md.: Penguin Books, 1962, pp. 132-133.
- ²¹ *Ibid.*, pp. 104-106.
- ²² *Illusions and Delusions of the Supernatural and the Occult*, by D. H. Rawcliffe. New York: Dover Publications, 1959.
- ²³ *Knowledge and Conduct*, "The Buddhist Conception of Truth," Kandy, Ceylon: by K.N. Jayatilleke. Buddhist Publication Society, 1963, pp. 31-34.
- ²⁴ *Bhagavad-Gita*.
- ²⁵ *The Way of Life, Tao-te-Ching*, translation by R.B. Blakney. New York: The New American Library, 1955.
- ²⁶ *Visuddhimagga*, XIX, 20.
- ²⁷ *Bhuridatta Jātaka*, No. 543.
- ²⁸ *Mahā-Bodhi Jātaka*, No. 528.
- ²⁹ *Aṅguttara Nikāya* I, 173. (Tika-Nipāta, No. 61).
- ³⁰ *Ashvaghosa, Buddha-carita*, 9, 53.
- ³¹ *Samyutta Nikāya* v. 437.
- ³² *Majjhima Nikāya* II, 32-33. (No. 79, *Culla-Sakuludāyi Sutta*).
- ³³ *The Three Signata*, by O. H. de A. Wijesekera. Kandy, Ceylon: The Buddhist Publication Society, 1960, p. 5. Wheel no. 20.
- ³⁴ *Dīgha Nikāya* II, 198. (No. 17, *Mahāsudassana Sutta*).
- ³⁵ *Majjhima Nikāya*, No. 56.
- ³⁶ *Samyutta Nikāya* II, 24. (XII, 20).

- ³⁷ Ibid. 12.4.
- ³⁸ Ibid. II, 69. (XII, 41).
- ³⁹ Ibid. II, 182. (XV, 5).
- ⁴⁰ *Buddhism and the Age of Science*, by LT Chan Htoon. Kandy, Ceylon: The Buddhist Publication Society, 1961, p. 67. Wheel no. 036/037
- ⁴¹ *Sutta Nipāta*, v. 785.
- ⁴² *Āṅguttara Nikāya* I 189. (Kālāma Sutta)
- ⁴³ *Early Buddhist Theory of Knowledge*, by K. N. Jayatilleke. London: George Allen & Unwin, 1963, p. 391.
- ⁴⁴ *Majjhima Nikāya* I 265 (No. 38 Mahātaṇhāsāṅkhasutta)
- ⁴⁵ *Saṃyutta Nikāya* IV, 299 (XLI, VII, 8)
- ⁴⁶ *Sutta Nipāta*, v. 884.
- ⁴⁷ *Knowledge and Conduct*, *op. cit.*, pp. 25-41.
- ⁴⁸ *Majjhima Nikāya* II, 148-149. (No. 93, *Assalayāna Sutta*).
- ⁴⁹ *Great Personalities on Buddhism*, by K. Dhammananda Thera. Kuala Lumpur, Malaysia: Buddhist Missionary Society, 1965, p. 87.
- ⁵⁰ *Further Dialogues of the Buddha*, Vol. II, tr. by Lord Chalmers. London, Oxford University Press, 1927, p. 115.
- ⁵¹ *Scientific American* Vol. 208, No. 1, "The Evolution of Galaxies", by Halton C. Arp. January, 1963, p. 71.
- ⁵² *Frontiers of Astronomy*, by Fred Hoyle. New York: New American Library, 1955, pp. 242-245.
- ⁵³ *Āṅguttara Nikāya* I, 227-228. (III, 8, 80).
- ⁵⁴ *Frontiers of Astronomy*, *op. cit.*, pp. 133-134.
- ⁵⁵ *Saṃyutta Nikāya* III, 149. (XXII, 99).
- ⁵⁶ *Āṅguttara Nikāya* IV, 100-102. (VII, VII, 62).
- ⁵⁷ *The Creation of the Universe*, by George Gamow. New York: New American Library, 1952, p. 111.
- ⁵⁸ *Frontiers of Astronomy*, *op. cit.*, p. 223.
- ⁵⁹ *A Manual of Abhidhamma*, Vol. II, by Nārada Thera. Colombo, Ceylon: 1957, pp. 6-7.
- ⁶⁰ *Visuddhimagga*, XI, 109.
- ⁶¹ One Å (i.e. one Ångstrom unit) equals one ten-millionth of a millimetre.
- ⁶² *Dīgha Nikāya* III, 80-98. (No. 27).
- ⁶³ *Saṃyutta Nikāya* II, 177. (XV, I, 1).
- ⁶⁴ *The Epistemology of Buddhism*, by Douglas M. Burns. San Carlos, California: Neo-Dhamma, October, 1963.
- ⁶⁵ *Majjhima Nikāya* I, 426-432. (No. 63, *Culla- Māluṅkya Sutta*).
- ⁶⁶ *A Manual of Abhidhamma*, *op. cit.*, p. 9.
- ⁶⁷ *Saṃyutta Nikāya* III, 143. (XXII, 96).
- ⁶⁸ Ibid. II, 94. (XII, 61).
- ⁶⁹ *Fundamentals of Buddhism*, by Nyānatiloka Mahāthera. Colombo, Ceylon: Bauddha Sahitya Sabha, 1949, pp. 13-15. Reprinted as Wheel no. 394-96, BPS, Kandy.
- ⁷⁰ *Saṃyutta Nikāya* III, 61. (XXII, 56).
- ⁷¹ *Majjhima Nikāya* I, 259. (No. 38, *Mahātaṇhāsāṅkhaya Sutta*).
- ⁷² *Saṃyutta Nikāya* III, 53. (XXII, 53).
- ⁷³ *Visuddhimagga* XVIII, 32-34.
- ⁷⁴ *Fundamentals of Buddhism*, *op. cit.*, p. 65.
- ⁷⁵ *Visuddhimagga*, X.
- ⁷⁶ *Majjhima Nikāya* III, 108. (No. 121, *Cullasuññata Sutta*).
- ⁷⁷ *Saṃyutta Nikāya* II, 61-62. (XII, 35).
- ⁷⁸ *Kamma and Rebirth*, by Nyanatiloka Mahāthera. Kandy, Ceylon: Buddhist Publication Society, pp. 5-7. Reprinted in *Fundamentals of Buddhism*, Wheel no. 394-96, BPS, Kandy.
- ⁷⁹ *Dependent Origination*, by Piyadassi Thera. Kandy, Ceylon: Buddhist Publication Society, 1959, p. 40. Wheel no. 15.
- ⁸⁰ *Visuddhimagga* XVII, 161.
- ⁸¹ *Milinda Pañha*, 46. (II, 2, 6).
- ⁸² Ibid., 71. (III, 5, 5).
- ⁸³ *The Evidence for Survival from Claimed Memories of Former Incarnations*, by Ian Stevenson. Surrey, England: Petro, 1961.
- ⁸⁴ *Buddhism and the Age of Science*, *op. cit.*, pp. 7-9.
- ⁸⁵ *Sacred Books of the Buddhists*, Vol. IV, by T. W. Rhys Davids. London: Oxford University Press, 1921, pp. vii-ix.

-
- ⁸⁶ *Buddhism*, by Richard A. Gard. New York: George Braziller, 1961, pp.46-47.
- ⁸⁷ *The Lion's Roar*, by David Maurice. London: Rider & Co., 1962, p.14.
- ⁸⁸ *Anthropology*, by Edward B. Taylor. London: MacMillan & Co., 1924, pp. 373-375.
- ⁸⁹ *Sacred Books of the Buddhists, op. cit.*, pp. 132-136.
- ⁹⁰ *Dīgha Nikāya III*, 142-179. (No. 30).
- ⁹¹ *Saṃyutta Nikāya V*, 424. (LVI, II).
- ⁹² *Sutta Nipāta*, vv. 91-115. 258-269.
- ⁹³ *Dīgha Nikāya II*, 263-289. (No. 21).
- ⁹⁴ *Ibid.* I, 215-222. (No. 11).
- ⁹⁵ *Ibid.* III, 1-28. (No. 24).
- ⁹⁶ *Majjhima Nikāya III*, 97-99. (No. 119, *Kāyagatasati Sutta*).
- ⁹⁷ *Dīgha Nikāya II*, 156. (No. 16, *Mahāparinibbāna Sutta*, VI).
- ⁹⁸ *Ibid.* III, 209. (No. 33).
- ⁹⁹ *Āṅguttara Nikāya IV* 358-359. (IX, 1, 4)
- ¹⁰⁰ *Saṃyutta Nikāya II*, 120-124. (XII, 7, 70).
- ¹⁰¹ *Dīgha Nikāya I*, 211-214. (No. 11, *Kevaḍḍha Sutta*).
- ¹⁰² *Vinaya V; Cullavagga V*, 8. tr. by T. W. Rhys Davids.
- ¹⁰³ *Sutta-Nipāta*, vv. 926-927. tr. by Frank Allen.
- ¹⁰⁴ *Dīgha Nikāya I*, 9-12. (No. 1). tr. by T.W. Rhys Davids.
- ¹⁰⁵ *Ibid.* III, 58-77 (No. 26).