

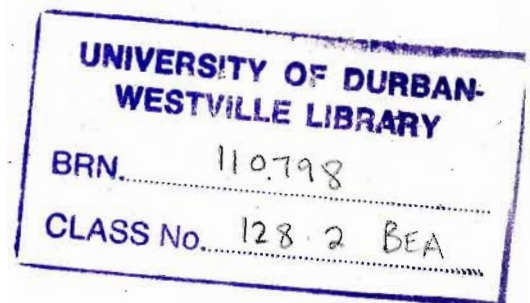
THE EMERGENCE OF MIND, A THEORY IN EVOLUTION

by

BERNARD EDWIN BEATER

Submitted in part fulfilment of the requirements  
for the degree of Doctor of Philosophy.

Department of Philosophy & Political Science  
in the faculty of Arts, in the  
University of Durban - Westville.



Promoter: Professor G.A. Rauche, D. Phil. (S.A.),  
D. Litt. (U.C.T.)

Date Submitted: October 28th, 1986.

T 870026



THE EMERGENCE OF MIND, A THEORY IN EVOLUTION

CONTENTS

|  | <u>Page</u> |
|--|-------------|
| Acknowledgements   | I           |
| An Abridgment  | III         |
| The Argument   | 1           |
| Introduction   | 5           |
| <br><u>Chapter One</u>   |             |
| Dawn and Advance of Life   | 16          |
| <br><u>Chapter Two</u>   |             |
| Emergence and Development of Consciousness<br>and Self-Consciousness | 39          |
| <br><u>Chapter Three</u>   |             |
| Discussion towards the Interpretation of<br>Mental Capacity          | 91          |
| <br><u>Chapter Four</u>  |             |
| Emergence of Mental Autonomy   | 132         |
| <br><br>   |             |
| Bibliography   | 175         |
| <br><br>   |             |
| Index of Persons   | 181         |

THE EMERGENCE OF MIND, A THEORY IN EVOLUTION

Diagrams

Figure 1.  
(Page 28)

Progressive Development of Human Brain

Figure 2.  
(Page 75)

Diagrammatic Representation of Emergence  
to Mind

Figure 3.  
(Page 103)

The Main Body of the Neuron  
(After G.R. Taylor)

ACKNOWLEDGEMENTS

The subject of this thesis can be said to be of far-reaching interest to humanity in that it vitally concerns not only the nature of man's existence on this planet, but also the very foundations for his mental advancement to an undreamed of insight into the great and noble traditions of what may be termed the true human situation.

The writer has to confess that when he set out to trace the record of the emergence of the human mind as stated within the theory of evolution, the "neuronic tangle," if one may so term the miracle of the human brain, beset him with the almost stupifying immensity and complexity of the problem before him.

It was at this crucial stage that the very modest brilliance of my Promoter, Prof. G.A. Rauche, backed by his unique international scholarship not only in philosophy, but in the higher reaches of science as well, came to my rescue and the way ahead became inspiringly clear. Man had emerged from primitive existence into a new world of startling beauty and profundity and all that he required now in order to preserve his near-godly state, was to guard and protect the heritage which had become his. It is no exaggeration to say that from the moment Professor Rauche opened the doors ahead of me, with that patience, kindness and efficacy so essential in philosophical debate that I was able to see clearly along the road ahead. From then on, I felt I was privileged to be travelling side by side/...

side with a philosopher uniquely aware of the human situation and all it entails, and it became a journey of deep inspiration.

For the devoted and highly efficient processing of this thesis, I am indebted to Michelle Nienaber of Price Waterhouse, Durban.

THE EMERGENCE OF MIND, A THEORY IN EVOLUTION

An Abridgment

This thesis defends a theory that mind or mental capacity is a phenomenon that has gradually emerged in meaning and complexity along with the gradual enlargement of the brain over the past two million years or so, the latter enlargement being recorded in palaeontological research.

The increase in brain volume was necessitated under changing conditions surrounding man's early existence, such material increase entailing a corresponding gradual increase in neuronal conductivity. This process of sophistication gave rise to increasing mental capacity, which likewise became more sophisticated as brain volume and neuronal connectivity continued to evolve.

Emergence of a more complex physical brain with its accompanying electro-chemical neuronal intercommunication network, particularly in the cortex or roof-brain, brought about consciousness and the power of thinking, which in turn gave rise to self-awareness, such remarkable properties arising in mental capacity also giving rise to man's ability to recognise a "self" as well as his physical body.

The whole force of the above theory of the emergence of mind

in/...

in evolution, as is researched throughout this thesis, rests on the hypothesis that such a force is directional, and secondly that such directional change is purposeful, and that the basis for this purposeful emergence is by virtue of little understood properties inherent in matter, the latter a term used in common speech for the materials of the universe and which physical science has reduced to ultimate particles and forms of energy.

The potential therein has provided the "basic thrust" which has given rise step-by-step to man as he exists to-day. Such purposeful advance has of course, been attained by specified levels of biological efficiency provided for the advance of man through evolutionary stages.

With man having evolved to an awareness of a "self", he is also an end in himself, embodying moral, ethical, aesthetic and religious persuasions. Such a state of mental autonomy has emerged with increasing rapidity over the last half million years or so and is presently involved with far-reaching advances in physics and science.

This thesis recognises the fact that evolution is proceeding now and through every moment of existence, and provided man in the present psychosocial era does not disrupt it, evolution will continue to take its natural course.

THE ARGUMENT

Evidence accumulated so far is extremely convincing that man has reached his present advanced status by a gradual process of evolutionary change, and with such change goes the theory that the human mind has likewise gradually emerged in conjunction with the development of brain volume, which latter has been clearly indicated in uncovered fossil discoveries which are dateable.

The whole force of the argument is that it is unlikely that man suddenly possessed the potential of a neuronic brain capable of giving rise to experiencing self-consciousness and subjectivity.

The earliest known true ancestors of man as maintained by evolutionary science, were the Australopithecine families, and it goes without saying that those primitive, slightly ape-like ancestors did not possess sufficient mental capacity to distinguish the self from the material body. What mental capacity they did have was sufficient for their primitive way of life, just as future development and emergence was designed to cope with changing circumstances of life over the ages.

Having briefly reviewed and discussed the dawn and advance of life in the first chapter, the study outlines the emergence and development of consciousness from the time of the Australopithecines, early known representatives of man in

the/...



the hominid line. This second chapter argues on the nature of consciousness and self-consciousness, pointing out amongst other things that the smaller early hominid brain volume, with its limited neuronal development, could not have been capable of providing the sophistication of the larger brain volume with all its remarkable systems of neuronal connectivity.

The emergence of mind-state in living organisms is an extremely unique phenomenon. Man's first vertebrate ancestor, the fish, for example, was, many millions of years before hominids appeared, considered to be the possessor of only specific neural pathways from the skin, causing sensitivity to touch and no more.

Successive progress towards refinement indicates that the age-old hypothesis that matter itself is the possessor of life-force appears to be authentic in philosophy, for brain could not be capable of emerging to almost three times its volume over two million years without a driving, purposeful life-force in matter, let alone the production of a highly sophisticated mental capacity induced to cope with historically altering conditions of existence.

Such an argument as the above does not appear to have been stressed sufficiently before, and it is the intention of this thesis to argue in support of it by reference to recent neurophysiological research and by reference to the long and honourable history of philosophy dating back to the early Greeks. In connection with the Greeks, it was their early

theory/...

theory of hylozoism that pronounced all nature as endowed with mind on the analogy of the existing human individual.

This original force is detected in some later systems of materialistic philosophy, though there are also many philosophies which choose to destroy the hylozoic concept such as those of functionalistic inspired systems of thought, and attempts to prevent man from leading an existence with his true nature exercised in the cause of ultimate freedom.

According to Spinoza, life and mind are not visitants in this world, but are blended with matter. This holistic concept is evidenced also in Bergson's "thrust of life" or vital force. Evolution is the outcome of an impulse of life, *elan vital*, manifesting itself in innumerable forms.

In the present work, it is implied that evolution is not identical with change, but with orderly sequence through changes in which new and purposeful features emerge. For there to be truth in existence, purpose or real ends are involved, otherwise life would become chaotic. Such purpose is infinite in nature, as argued by Anaximander, otherwise the objects of creation would necessarily come to an end because of the ceaseless demands of changing life. There is also the Milesian argument stating that so-called "inanimate" objects possess life, which is an attempt to explain causal forces, development and emergence.

Such a cosmic principle is believed to be the force originating mental capacity and its emergence to higher levels in the selected hominid line. In other words, matter originally

contains/...



contains its own means of animation. What was started on earth millions of years ago is moving forward by an inexorable law inherent in the fundamental nature of matter and designed towards an end.

Consequently the emergence of mental capacity from Australopithecus onwards, is in tune with the basic concepts of the history of most past philosophy.

As it presently exists, mental capacity, more commonly referred to as mind, has biologically emerged into a sphere of autonomy over the past several thousands of years. In such a sphere all may not necessarily be well for man, who has continued also with his disposition for conflict still lingering from his primitive past where it was necessary for his preservation from extinction.

It is argued, however, that such a disposition will gradually become less assertive, and further emergence of mental capacity lead man to a deeper understanding of the purpose and value of existence within the environment of the natural world.

INTRODUCTION

In evolutionary theory it is maintained that human beings are an amalgam of the past, their basic pattern traceable to the very beginnings of vertebrate history in the Ordovician Period of about four hundred and fifty million years ago. It is further maintained that, in order to understand ourselves, we have to learn to recognise the age-old elements from which we have emerged and how and why they go together as they do. It has also been argued that genes still carry messages that primitive humans once needed for survival, which could be a feature of much importance in contemplating the basic nature of modern man.

The general view is that evolution is the natural addition of information given to living organisms to enhance their capacity to survive under changing conditions. Man has come to need an ever increasing variety of means to avoid extinction, strange as that concept may seem, and has so far achieved such by an evolved capacity for conscious selection of various possibilities over the past many thousands of years.

The remarkable growth of neural tissue in early man's brain, stood him well in this respect, the brain attaining its maximum volume about a hundred thousand years ago (Figure 1, Page 28), with the Neanderthals attaining a brain volume of fifteen to sixteen hundred ml, slightly larger than that of modern man to-day.

This capacity was scarcely put into use until many  
thousands/...

thousands of years later, which, it could be said lay like a luxury in their skulls. Of course the reason for such ineptitude was in the lack of neuronal connectivity, in other words in the active organised or trained quality of grey matter, although its general structure was little different from a structure which in modern times could give rise to genius. The reason obviously was the lack of neuronal intercommunications via neuronal modules in the cortex, that is, complexly organised assemblages of some thousands of neurons each, resembling in some respects integrated micro-circuits of electronics, only far more complicated. It has been maintained that this kind of assemblage in dynamic operation could possibly have given rise to the self-conscious mind, though such is as yet pure conjecture.

The incredible feature about brain evolution is how and why a fairly hairless, scavenging ape-like creature such as Australopithecus had within him the potential of such a miracle of neuronal organisation as the cerebral module ready in his brain for further correct usage. Such a brain was not fully prepared for use until some million and a half years later, and the still more remarkable feature is its survival to become what various scientists regard as one of the greatest and most intricate wonders of the world.

From early times, men of intellect have given their attention to such disciplines as philosophy and science in attempts to elucidate the nature of man and the environment he exists in. The early Greeks were an amalgam of philosophy and science and exemplified with exceptional brilliance the natural

reflective quality of the individual. Much of their truth-perspectives have been superceded in the course of historical accumulation of knowledge, but the method they used, namely an open, critical and reflective approach has hardly been equalled. It is of interest to observe that from the Platonic view there can be no philosophy where there is no science.

After the breakdown of the early strongly scientific-orientated philosophy, the trend swung the other way, that is to reconstruction along moral, ethical and intellectual lines, and both philosophy and science proceeded on the assumption that there is some fundamental reality which can be discovered, and that the beliefs of both Plato and Aristotle that man should live peacefully and constructively in harmony with nature was desirable. In the Middle Ages, this was to be sought largely through faith, but arguments over the virtues of faith versus reason led to the breakdown of the medieval world-view, a break-down which was accentuated by discoveries and inventions, a shifting of interest from God to man as the centre of the world and a new interest in the natural sciences and a new approach to philosophy as well, a divergence of view between reason and experience. The transcendental philosophy of Kant was that both reason and experience are the constitutive source of knowledge, but there must be a continual striving to try and know truth, though ultimately it transcends human understanding.

The philosophic struggle about truth and the problem of human existence swayed back and forth, but in the meantime a

natural/...

natural scientist by the name of Charles Darwin set about a voyage of discovery in the world of nature and formulated the belief that evolution proceeds by natural selection of heritable variations. In a certain sense Darwinism closed the gap between early Greeks and the modern concept of evolution. Sahakian writes (1969) : "Anaximander also contributed a theory of evolution strikingly close to the Darwinian hypothesis, for he attributed organic life to the action of fluid in drying up sufficiently to form fish-like creatures which developed into animals through a process of adapting themselves to life on land. The human species was the end result of this process of adaptation."

Since the time of Darwin there has been much interest in the theory of evolution, particularly with respect to the emergence of mind and its relation to the neuronc brain. Jules Fabre stated that the brain was "life's crowning mental gift." Sherrington described the brain as an organ whose "precision beggars any imagery I may have," and J.Z. Young, the biologist stated, "A brain to me means a set of nerve cells of immense complexity whose intense activity is continually directed to furthering the life of a particular individual." The latter phrase is the key to the reason why the large brain, which is the hallmark of man, should have evolved as remarkably as it did. The main reason for this relatively rapid evolution of neural tissue might well be regarded as a means of preserving man from extinction. If such were true is it not regrettable that he is now using this miracle of organisation to further, unwittingly perhaps, his own extinction through various "civilized devices?"

The main feature of brain evolution has been the corresponding emergence of mind with the dawning of the truth that we are free conscious individuals capable of personal experiencing and personal thinking.

One of the inescapable beliefs surrounding such emergence is the purposiveness of the process of change. Is it directional or chance? Human reason is not able to be certain and even consciousness itself cannot be completely understood by means of either logical, scientific or mathematical analysis. In other words the miracle gift of the brain-mind complex is not forthcoming with an answer. But man has a deep yearning to know, and it is in this yearning that there dwells a certain security that there is purpose taking man forward, such purpose being manifest in the truth of existence itself.

The Roman Catholic priest-philosopher, Teilhard de Chardin, a student of evolution, ventured beyond the limits of Scholasticism, in which man and nature were very largely lost from view, to distinguish in the real world a "material" outer side and a "spiritual" inner side. In other words, there is no such thing as an existent that is solely physical, nor an existent that is solely reminiscent, but rather only matter that will become spirit (1959). Such a philosophy that in the world there is neither matter nor spirit but a world-stuff which is a combination of both, is in truth a philosophy which is reminiscent of Greek hylozoism.

Despite many lateral and downward trends, evolutionary progress, Julian Huxley maintains (1974), is referable to  
specified/...



specified upper levels of biological efficiency attained by life at successive periods of evolution, that is, those that escape running up "blind alleys". The raising of this upper level of efficiency, results from increasing control over the environment, which is a basic biological fact, and not man, being anthropomorphic.

T.H. Huxley states that it is the duty of man to strive and educate himself, so that he should become worthy of survival. He should not continue having aspirations for struggling against nature, but use his intuition to defy destructive cosmic forces, curbing "egoistic instincts" and constantly aiming for a higher level of development with the remarkable gifts already presented to him in evolution.

In discussing the theory of evolutionary emergence of mind in the following pages, various moral, ethical and religious views and conventions are respected and, in particular, as stated earlier, credence must be given to the very real possibility of purpose. This indeed may be apparent when reflecting on the Palaeozoic Era which terminated about two hundred and seventy million years ago with its extremely hostile environment. This was the foundation for the extensive happenings of the succeeding Mesozoic and Cainozoic Eras which finally gave rise to what many consider the first true man, Homo erectus, in the Quaternary Period, though the problem still remains very controversial.

The evolution of man from the Lower to the Upper Pleistocene Eras, involving slightly less than two million years, centres round the move towards upright gait, the

recedence/...

recedence of the jaw and above all the enlargement of the cortex. In actuality, hand and foot reached the human stage before brain-size, though it is remarkable that creatures with ape-size brains could make and use tools about one and three quarter million years ago, (1965).

The above facts are brought into focus to remind one that thinking, rational, sentient, highly individual man of to-day was not always so, and that even the miracle emergence of mind does not completely sever him from the past, nor are we scientifically justified in assuming that evolutionary processes which gave rise to the phenomenon of man were anything other than completely normal processes and in no way distinct from those of the rest of the living world. Young points out (1978) that, "We may be more inclined to re-examine our attitude to these questions and to ask how far the properties we ascribe to minds and hence also to brains, are a result of linguistic conventions." Young also stresses that a proper study of how the brain operates will enable us to see more clearly the place that so-called cultural and spiritual activities play in human homeostasis.

This thesis attempts to account for factors which accounted for the emergence of consciousness, personal awareness of the self and the general structure of autonomy in which the human mind finds itself to-day, all in the light of emergence. The disciplines most favoured for this exercise are philosophy and science, the combination of which also gave rise to the creative thinking of the early Greeks.

With/...

With the emergence of mind, by virtue of a burgeoning neuronal brain, man attempts to sort out his place within the structure of the world he now finds himself in, channelling his thinking along lines of the various disciplines, utilising the highly evolved brain to choose possible courses of action modelled and established in the vast labyrinth of organised brain neurons, all overseen, as it were, by the active agency of the emerged mind. In this manner, man participates as a thinking, creative unit of human existence. The controversy as to whether it is the brain or the mind responsible for such design is skirted, with only occasional reference to the problem of brain-mind relationship. It is however, noted with interest that the Russian neurologist, Luria, is emphatic that it is the brain that creates models of the future. This would imply that nerve cells, as part of a living system doing things, are basically creative in themselves with the potential of inter-communication among the many organised millions. Their main concern, as nature intended, is to maintain the living system by the "drive" of the life process, but the pattern of life has become such that man seeks additional answers to the way of life, and in this respect he may not always tread with safety in regard to the natural laws that have brought him to the eminence he enjoys in the world to-day.

This so-called freedom of the mind to reason and think is therefore accompanied by a degree of uncertainty, which is born out by many conflicting philosophies. Rauche, for example, points out (1974), that, "As a result of the final collapse of the old culture and the discrediting of the old cultural norms and values in consequence of the two World Wars, three  
outstanding/...

outstanding forms of the abdication of philosophy emerged: neo-positivism, contemporary existentialism and neo-Marxism. The first form takes its origin in the growing importance of the natural sciences and technology of man's everyday life and for human existence in general. Paradoxically, the progress and advance of the natural sciences had reached a point where they were no longer able to present to man a coherent world-view."

Rauche also states further that the existentialist approach seeks to gain the understanding of man as an individual through an analysis of his inner experience, or more suitably his inner moods and his relationship to the world and to be Absolute, which is the hermeneutic method.

In regard to neo-Marxism, Rauche states that it was an opinion that in order to be saved, philosophy had to be destroyed and merged in practice. By such a doctrine it was hoped to overcome man's alienation from reality and to lead him to freedom and authentic existence and no longer to continue dwelling in an ivory tower.

In all the above it is seen how readily philosophy can turn from theory into an analytical and descriptive activity, which can lead to a curbing of man's free creative thought and boxing it into closed ideologies, which undoubtedly nature did not intend when promoting the emergence of mind with its urge for free self-expression, not of course proceeding forward blindly but in a realistic sense, taking cognisance of the

perspectives/...

perspectives of Truth as far as such can be understood in the natural world we are born into.

It has to be appreciated that our intellectual flights are generated by states of the brain sometimes chemically induced and that they are given free reign in a neuronic system which is purely physical and subject to extinction at any time. The sphere of autonomy to which mind has emerged implies spontaneous and independent thoughts and impulses, but many of these are actually guided by obedience and submission and not from a free recognition of their rightness. For example a man can go to church regularly to fit in with the judgement of his community. Etiquette, rules of propriety in social living have a strong bearing on man's free-will, but in general he is as an individual, empowered not necessarily to communicate his inner thoughts. On the other hand, private intuitionism can be less beneficial to the state than a sound sociological working out of problems of generally acceptable appeal which may or may not comply with the personality or disposition of the individual, but to which he adheres for the good of the state or community. At all events the condition of mental autonomy to which mind has emerged through evolution is shaky, but can never deny man the privilege of seeking truth throughout the continually changing circumstances of life.



References to Introduction

- Sahakian, William S. (1969). Outline - History of Philosophy.  
Barnes & Nobel, New York, p.3.
- Teilhard de Chardin, P. (1959). The Phenomenon of Man.  
New York.
- Huxley, Julian (1974). Evolution. The Modern Synthesis.  
George Allen & Unwin, London.
- Tobias, P.V. (1965). Australopithecus, Homo habilis,  
Tool Using and Tool Making. South African  
Archeological Bulletin, Vol. 20, p.p. 167-192.
- Young, J.Z. (1978). Programs of the Brain.  
Oxford University Press, London, p.36.
- Rauche, G.A. (1974). The Abdication of Philosophy = The  
Abdication of Man. Martinus Nijhoff, The Hague,  
p.78.

CHAPTER ONE

DAWN AND ADVANCE OF LIFE

When life dawned on this planet, the beginnings of the evolution of man were exceedingly remote and many millions of years elapsed before any creature resembling man walked the earth. Palaeontologists and biologists are agreed that controversy occurs less to-day concerning the ancestry of man, since as more evidence arises, the nature of his evolution also becomes more evident, particularly from humanlike fossils buried under ash from volcanoes, some of which date back nearly three million years, indicating that the human species is derived not from a single pair, but a heterogeneous population. There were, in fact, several distinct lines of creatures later evolving in a not truly human direction, all having left the forest and begun to walk on two legs, probably hunting game on the open plains.

Evolution arises in self-maintaining activities of molecules characterising a continuum in an assemblage of sets capable of continuing into the future. In this way, life once initiated continued through all the vast upheavals and disturbances of earth's early history. When it is considered that man's ape-like ancestor, in the Miocene period of about fifteen million years ago, with a brain volume about one third that of present man, carried a certain resemblance to man, it must be realised how very gradual has been the process of evolution. In this respect, the emergence of mind must have been an extremely gradual process as well, the initial stages

dating/...

dating back further than the Australopithecine families, small in stature, with a brain capacity of about five hundred ml, about one third that of modern man, but with every indication that they could very well have been on the direct line of human descent, though there is still no full agreement on this. However, Broom (1937) states : "There seems no doubt that it, Australopithecus, is the fossil ape nearest to man's ancestor at present known."

Further discoveries of this partially hominid group, have fairly recently, about 1960, been uncovered in East Africa and South Africa and there is evidence of Africa-wide populations of Australopithecines, and from evidence gathered and expressed by Tobias (1965), following the discovery of the fossil of *Homo habilis*, the gap is bridged of the last remaining major interval, in the Pleistocene, of man's evolution.

As regards the abovementioned fundamental issues, science has shown life to have had a common origin, as evidenced by the fact of complex units where the molecules of living systems are organised within their cells. In fact it is held that molecular compounds are collected into cells of surprisingly limited forms, where the choice otherwise could have been so very much more diverse. In this way, life might very well be defined as an assemblage of cells grouped in a particular way to cope with an environment suitable for survival, or until circumstances of an altered environment modified the assemblage to suit development.

It follows that there is a continuity in living matter

from/...



from its origin, that is, since the very first organic molecules occurred and commenced biogenetic growth, in an atmosphere, be it realised, completely lacking in oxygen and which was consequently reducing. Objects which resemble fossilised bacteria and blue-green algae have been found in flint rocks in Canada, dating back two thousand million years, and in even older sediments.

In the succeeding Cambrian of six hundred million years ago, there were numerous fossil molluscs, crustaceous and sea urchin-like creatures, evolving in an environment which had now built up a supply of oxygen and replacing the early atmosphere of methane, ammonia, water, carbon monoxide and carbon dioxide, the first three of which have been found to presently be the atmosphere of the planet Jupiter.

From the foregoing, it can be said that it was basically a chemical change which guided the course of evolution at that time, adapting and developing organisms under new environmental conditions. As is so frequently evidenced, one notices in the history of evolution, a persistent drive involving selection between alternative possibilities and so enabling survival under an ever-widening range of habitats. In this connection, as organisms have become more complicated, they have come to need an ever larger variety of possible actions to avoid dissolution, making choice also wider and more difficult, reaching its maximum in human beings, who can live almost anywhere on earth, even beyond it!

In the philosophy of Bergson, the central principle is

the/...

the reality of change, as indeed it was for the early Greek philosopher, Heraclitus, many centuries ago. Reality is a flux of change in an unchanging world. It's very essence is movement or continuous flow, the living change involving organisms in a vital forward surge.

It is interesting to note that most nineteenth century biologists regarded adaptation as a mechanical process whereby organisms automatically responded to changes in the stimuli from outside in the environment. To-day it is not regarded as simple as that, but due also to an underlying urge or thrust or purpose, Bergson's elan vital, for example.

We know now that natural selection of its own does not cause advance, and in this sense evolution is not necessarily identical with Darwinism, but it is inevitable that further emphasis should be given to Darwin's great contribution to knowledge by a closer philosophic expression of what is really involved. This is a direction followed by the biologist Ernst Haeckel in his discussion of the riddle of the universe, though as a materialist, he did not gain lasting popularity.

If philosophers are unsure of the significance of change, one thing is certain, life goes on and never stops. Individuals die, but, and this is important, their genes go on in the character of man. Genes also of other animals and plants alive to-day, embody information that has accumulated over millions of years. But what continues is never quite the same, for example life is ever finding new ways to exist and in this respect brain networks are never at rest, but the various distinct parts pull together to work as a functioning whole,

and/...

and to produce a continuous flow of experience which is best described as "mental life," the production of which results from electrical and chemical events in the brain neurons; but the transference does suggest some alterations in the probability of future actions of neurons. And that in brief, is also the very important theory accompanying the emergence of mind.

Palaeontologists who have followed up change in evolution, have agreed that it is directional, a process quite undetectable by microelectrodes or any other advanced instrument. One can only judge such change by "then and now", the presumable almost ape-like guttural grunts and signs of the Lower Palaeolithic line to Homo sapiens to-day. Speech was not developed until about two hundred and fifty thousand years ago, that is until sufficient connectivity took place in the frontal lobes with brain volume much greater. It was about this time that the loom of language, as Plato calls it, entered into the fabric of human culture in its broadest sense, certainly not less than a hundred and fifty thousand years ago.

An interesting study made was that when latex rubber was poured into an ancient and fossilised cranium, it picked up a very slight impression of the brain that rested there. On a few casts from two million-year-old skulls, there is a barely detectable bump over the area which the French anatomist, Paul Broca, correctly claimed was precisely responsible for translating ideas into words, which was the first time that any localised brain function could be traced in man's history. Such an experiment, which demonstrated that the brain actually had some kind of comprehensible structure caused great interest

amongst/...

amongst neurologists, and led to future research which indicated that different cell-groups were connected to different areas of the body, for example the occipital lobe at the back of the brain is the area responsible for vision, where stimulation produces flashes of light. Later on the Canadian surgeon, Wilder Penfield, discovered that memories can be evoked by stimulation. The once so-called "silent areas" in the frontal lobes have now been discovered as plan-making apparatus, or the executive of the brain.

From earliest times in the history of man, there have been many and varied manifestations, with unfortunately no traces of later hominid remains being discovered as yet, bringing to a halt one period of human evolution, and resulting in a blank drawn across the emergence of the first indications of more advanced symbols or forerunners of future culture. It would appear doubtful if the savage biped of long ago, such as *H. habilis* was, had any organisation or system which could give rise to the elements of culture such as institutional forms of behaviour and group practices. In other words, it would seem that the coming together into families and groups was a primary essential for the later emergence of culture, ethical, moral and religious values, however primitive, being a feature.

As stated earlier, the evolution of brain was an extremely gradual process and it is therefore likely that in human society, language consciousness also emerged gradually, all of which indicates that we should look to evolution for our culture. That is the reason it is believed why man should not look elsewhere for the source of mind, as though it were a feature quite unlike anything else in nature. Mind emerged

because/...

because it was necessary, and still is so, for survival. At least it has, since its emergence, been responsible for the tendency or disposition of man and other living things to maintain a steady state in spite of many changing conditions, which is the principle of homoeostasis or natural regulation and control, even using sensors to detect deviations. It is indeed such homoeostasis which promotes the needs of the young child in particular. In this respect, there is a large measure of mechanical control about life. We can live, be happy and healthy without thinking and planning out our bodily functions, because they are seen to be done by nature. It is when mental powers emerge and "overflow", that we turn to a search for a cosmic background, the early evidence in pre-historic times being when man turned to witchcraft. This was followed by the belief in fictitious beings impersonating natural phenomena, for example the early mythological cults of many races. The history of religion shows many stages no longer recognised.

In modern times philosophers recognised the need for man to acquire a rational view, some keeping pace with the developments of modern science, others constructing their own systems, based on metaphysical conception, Bergson, for example, emphasising that the universe must be conceived as one continuous flow, which is alive, evolution being the movement of the flow, or "continuity of outflow", expressing the universe's vital urge. The world is basically the embodiment of an immanent principle of living change, a creative force, a thrusting force, behind or within, a philosophy really counteracting materialism or mechanistic notions of the evolution of life in nature, and suggesting a rudimentary form of consciousness in all living organisms. The implications

of this vital philosophy are that mind emerged in capability to control cerebral activity in a rational direction.

As we pursue the evolution of man along the chain of life from the Pleistocene through to the Recent, one notes his gradual acquisition of social habits superseding the law of the jungle, though aspects of his primitive past still linger. Nevertheless, as one considers progress in the emergence of mind, man is by no means at peace, social and political disturbances being frequent happenings. Personal intrigues, sexual jealousy and desire, love of power, thwarted ambition, slighted vanities and injured prides, all have a part in determining events, especially when in the hands of unscrupulous leaders, with sometimes unpredictable results. As an example, quoted by Bertrand Russell, it was unlikely that the Russian Revolution would have achieved what it did without the genius of Lenin, or to take a more fantastic example, it may be maintained quite plausibly that if Henry VIII had not fallen in love with Anne Boleyn, the United States would not now exist, for it is owing to this event that England broke with the Papacy and therefore did not acknowledge the Pope's gift of the Americas to Spain and Portugal. The conflict between Communism and Capitalism could very well have led to barbarism, according to Russell, a possibility which Marx did not envisage as he had not taken fully into consideration the enormous increase in man's power of destruction. That power has now increased out of all proportion. If this has been an outcome of the emergence of mind, then it could be interpreted as a misdirection of vital creative forces, rather than nature's design to restore balance.

The fact remains that such a potential does exist and

man's/...

man's pride of place in the cycle and advance of life could become indeterminate if he slips out of the main current of creative vital force as visualised by Bergson. If philosophy is to be the evaluation of the facts and values of human experience, it must surely look to both the future and the past, as pointed out by D.W. Hamlyn (1984).

Man, though now a highly evolved animal with an opportunity to acquire self-realisation, is by no means the centre of the universe, but is still in process, and because of inhabiting, as he does, an ever-changing world, he must continually adapt himself in every aspect of human existence. That is why importance is attached to an acquaintance with the evolution of man, and in particular to the emergence of mind within that theory. In this connection, the question has to be faced as to whether the idea of evolution of mind in emergent evolution, is or is not at variance logically with the general conception of emergence towards a more fulfilling purpose.

Goudge states (1965) that the concept of emergence has been analysed with considerable precision during recent decades, so that its meaning is more evident now than it was when first introduced. Added to this is the vitality introduced into evolutionary ideas, notably in recent years by such philosophers as Teilhard de Chardin, whose basic belief was that for all organisms, the act of existing is an act of evolving, and essence has to be defined in terms of directional change. Teilhard's is a reassuring evolutionary vision, namely, that man has come into existence from primitive ancestry, and since he is

continuing/...

continuing to evolve, it is understandable that his mental life will emerge still further. "Essence" has to be defined in terms of directional change through a series of levels. The previous level, for example, might be considered as happening before the appearance of modern man, over a hundred thousand years ago.

Teilhard is acknowledged as a mystic, blending rhapsody with logic, but there is nothing illogical about believing that the genes at the organic level emerge later at the level of the noosphere, surely a fairly creditable explanatory hypothesis for a formative stage in the evolution of man and not be discarded as a useful model for anthropologists, sociologists and psychologists, as well as philosophers. The name noosphere is actually derived or built on the representation of the geology of the earth as a sequence of concentric, spherical shells or envelopes, enveloping the globe and finally in cultural evolution followed by a sheet of "humanised and socialised matter" called the noosphere and exclusively the product of Homo sapiens. It is a promising device to add meaning in understandable language to a theory based essentially on a simple device of nature to effect growth, change and progress in organic life.

Emergent evolution was formulated by Lloyd Morgan and Samuel Alexander as an interpretation of the history of nature, and to provide a way of interpreting biological evolution without having recourse to mechanistic, vitalistic, reductionist and preformationist ideas, and there is some good sense in Teilhard's isolating change into levels. Although evolution is a continuous process, much of it is discontinuous with preceding  
change/...



change, often quite abrupt and sudden and rather contrary to scientific reason. Such a realisation as this undoubtedly prompted J.B.S. Haldane to write, (1932), that "the doctrine of emergence may conceivably be true, but it is radically opposed to the spirit of science." In other words, discontinuity lies within continuity.

With the above in view, palaeontologists are not always baffled by existing "gaps" in hominid evolution, because the continuity is still obviously there and further research has the potential to elucidate many controversial problems. As J.B.S. Haldane succinctly observed, "The universe is not only queerer than we think but queerer than we can think." It must also be appreciated that some of our inability to appreciate the true meaning of emergence in evolution, is because language has been partly responsible. An example of this could be Darwin's early use of the word "struggle" of evolution, with all the overtones of such metaphors.

The recent discoveries of Leakey in Africa have given evidence that the brain evolved gradually, and it has been possible to put together a reasonable picture of evolution of hominids since the widespread Australopithecine families of about two and a half million years ago. There are gaps, but artefacts and the use of fire have been valuable indicators of the nature of these near-ape-like creatures. Incidentally, the Swanscombe skull found in Kent, and dated a quarter of a million years ago, has mostly modern features, and the brain volume was "human".

The argument as to whether Australopithecines really  
were/...

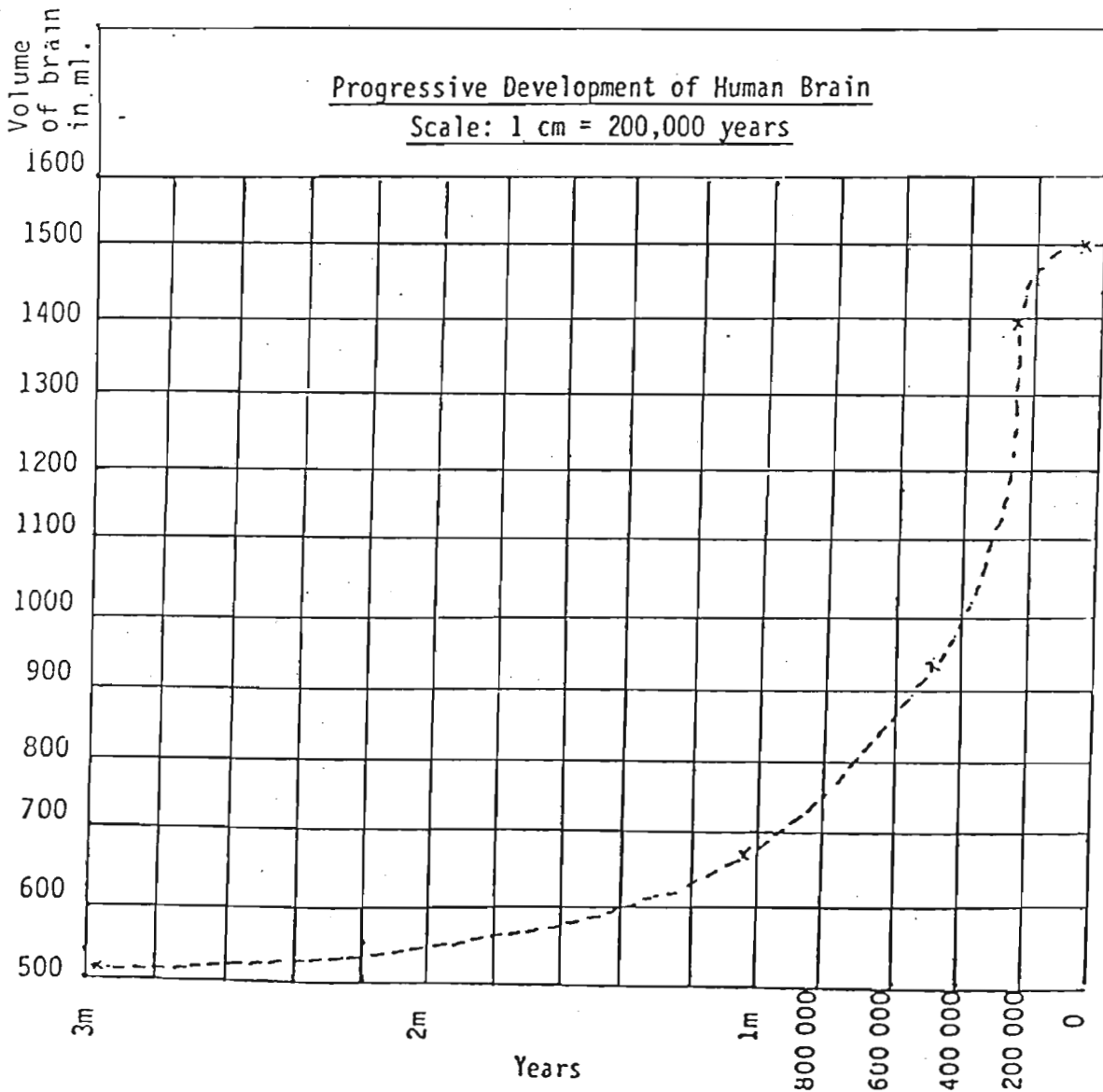
were man's ancestors of some two to three million years ago is not a vital point. What is important is the development of the brain "along the hominid line" of ape-human creatures. In this respect emphasis has been placed on the work and conclusions of Tobias (1965), earlier referred to. Tobias asserts that there is scarcely room for any doubt that Homo and Australopithecus stemmed from a common ancestry, despite the fact that there remains a large morphological gap between Australopithecus africanus and Homo erectus. Recently this morphological gap has been filled in by an intermediary, Homo habilis, thus spanning the last remaining major gap in the Pleistocene part of the story of human evolution, as stated earlier. There still remain gaps, however, such as the paucity of fossils from the Pliocene Epoch previous to that of the Pleistocene, which so actively featured the dawn of man.

Primitive artifacts are useful guides to mental evolution. Pebble tools were made in South Africa during the period of the Australopithecines, as for example in what is known as the Oldowan Culture of East Africa. Research by Tobias can definitely establish that if there is any doubt about this, there is little doubt that Homo habilis of the Lower Pleistocene and with a brain volume of about six hundred and ninety ml, was the first hominid to make stone tools, indicating an early form of genetically determined mental capacity at about a million and a half years ago. Succeeding Homo erectus certainly made rather good flints, had a rudimentary "language", divided tasks, transferred embers from one site to another in hide sacks and made shelters, all with a brain capacity of about nine hundred and fifty ml, and about half a million years ago. And so one can conclude that mind had significantly emerged by that period.

The approximate stages of man's evolution, together with brain volume, determined by palaeontologists at the sites uncovered, are presented in the following table and represented below in the diagram. The dating of the commencement of the cultural period is quoted as two hundred to three hundred thousand years ago.

| <u>Species</u>       | <u>Years ago</u> | <u>Brain volume</u> |
|----------------------|------------------|---------------------|
| Australopithecus     | 3 million        | 500 ml              |
| Homo habilis         | 1½ million       | 680 ml              |
| Homo erectus         | 500,000          | 950 ml              |
| Homo sapiens         | 250,000          | 1400 ml             |
| Homo sapiens sapiens | 10,000           | 1500 ml             |

Figure 1



It was, of course, later, at two hundred and fifty thousand years ago, that emergence really accelerated. Before this time, the speed of man's evolution was not at all flattering. Certainly the indication of the tools he left behind him confirms this slow mental development, because as he developed a still larger brain, there was scant evidence that he was using it, or had need of it. Still the forward march of evolution went on evolving an ever greater neuronic centre as though in preparation for the distant future, to witness Neanderthal's even greater than modern man's brain, over fifty thousand years ago. The brain actually advanced to the sapiens level tens of thousands of years before it was much exploited and of course mind could only emerge rapidly when neuronic brain was put to work as in the advanced cultural period which did not begin until the intellectual powers and the linguistic competence of Homo sapiens had become well developed with increased complexity of organisation and efficiency of working. Julian Huxley has pointed out that "biological progress is marked by the intensification and improvement of mental capacity and its results, in particular, knowledge and organisation of knowledge," that is, life is constantly leading into regions of new evolutionary possibilities.

Whatever the heights to which Homo evolves, life to-day and in the future is no less a miracle than it was in Pre-Cambrian times when those first organic molecules began to stir of their own accord. Not even when mind began to emerge, a phenomenon Spinoza termed "an infinite attribute of nature," was there a greater miracle than the first stirrings of the germ of life which induced it to crawl out of the Mesozoic slime and

take/...

take its rightful place on earth, eventually evolving into man, classed by Teilhard as now the "spectator of evolution." (After Emile Rideau, 1965).

Teilhard, the visionary philosopher-scientist, had an inspired view of man and his relation to the cosmos. He was well aware of the "creative current" underlying evolution which dictated the conduct of organisms vested with life and controlled by a pre-existing order in what is known as the "natural information store" built into living things. Nevertheless, there are innumerable examples of failure to meet the challenge of the environment, a classical example being the dinosauria, a group of animals, often of immense size, which suffered extinction due to natural causes. On the other hand, the tortoise with the special protection of its shell and relatively low adult mortality, continues to plod on from the Permian.

It is believed that, right down to its organisation at the molecular level, life retains an aura of mystery, which has not ceased since the dawn of life. For example, some basic features of man's structure to-day are traceable to extremely remote times, as biologists know.

As is widely believed, living things do have the purpose and aim to survive, in fact, a fundamental characteristic common to all living things. Moreover, this is achieved with an efficiency rarely approached in any man-made machine, and by an apparatus entirely logical. This efficiency is traceable to reference standards in the brain, but appears to go further than

that/...

that, with the possibility that matter itself possesses fundamental qualities, but allows these to pass naturally in life. The Hellenic school of the Greek metaphysical pluralists under Empedocles introduced the concept of the introduction of change and rearrangement in the four basic substances in the universe, though they (fire, air, water and earth) are unchanging in themselves. This philosophy of change and rearrangement in matter provided an orderly cosmos, the agent being a moving force, a well-accepted philosophy which remained valid until the early eighteenth century. Aristotle actually introduced the word "entelechy", mind being the entelechy of the body, which to-day is defined as the vital element that controls and directs responses to stimuli.

A study of the dawn and advance of living things has its fascination when it is realised that man is involved in it by evolution. Unfortunately, for the student of evolution, there are, for some unexplained reason, no vestiges of extinct life in the hundreds of thousands of feet of Pre-Cambrian era of gloom and murkiness on earth, a fact which has given rise to the phrase "Pre-Cambrian riddle." It was as though nature wished modesty to conceal the birth throes of its remarkable miracle offspring. However, evidence has poured in since the middle of the Cambrian, about five hundred and fifty million years ago, numerous bodies of soft invertebrate animals being found, such as those of worms. A pure guess has been given for the dawn of living things which are definitely animal in nature, as a thousand million years ago.

There must have been a stage in which plant life and animal life were difficult to distinguish. A major distinction, however, /...

however, is that plants can make organic chemicals, whereas animal life cannot. Animals consume food, but cannot create it, whereas plants can, from chlorophyll. What most surely is amazing is that minute unicellular forms of life of a thousand million or so years ago, brought into existence the first simple animals. That these first forms of life were living animals themselves is shown by the fact that most of them possessed the means to move about by the use of a flagella-like appendage, not altogether unique, however, because it is thought that some of the higher plants may also have arisen from flagella-equipped plants.

From single-celled life there arose multi-cellular forms of life, the primitive sponges may be quoted in this respect. This very ancient animal group was present in the Lower Cambrian period, showing that the evolution from the protozoan to metazoan forms of animal had taken place about six hundred million years ago, not to mention other living bodies too soft to leave fossilized traces. The Mid-Ordovician of about five hundred million years ago, however, does present fossilized impressions of many far more advanced higher-form descendants, in what zoologists term "metazoan phyla." The Ordovician, also, produced many and diverse preserved sea shells, with gastropods such as limpets, snails, slugs and so on, creatures actually now breathing by means of rudimentary lung-like sacs.

In the succeeding several hundred million years, the evolution of life was recorded in fossilised remains preserved in the later Palaeozoic and early Mesozoic Eras. Primitive Triassic vertebrates were now swimming in the early Mesozoic seas/...

seas, and in general living creatures were less remotely connected to man through such features as a primitive brain and a jointed backbone.

The various stages of fish evolution, in which the changes in their bodies which they passed through, have largely been stages which have taken place in land animals, those that originally came out of the sea. As referred to earlier, much of the structural pattern which we have in our own bodies, was developed step by step in the evolution of fish, over a hundred million years before the initial stages of the land invasion began, by creatures that were essentially amphibians. By the Late Permian and Early Triassic Periods of some two hundred million years ago, monsters had begun to take over the land masses. Their ancestors had found that instead of thrusting their heads out of water to obtain oxygen, it was more expedient to learn to wade ashore.

And so life became divided between sea and land. The tendency towards land-dwelling actually commenced four hundred million years ago in the Devonian Period, when fish began to evolve lungs. Land in those geological ages must have been bare and inhospitable, so it is dubious whether evolution of lungs could have been an active "preparation" for land-dwelling, though the course of evolution does remain a mystery on occasion. It has been said in this respect, that the theory of evolution actually becomes an uncertain force in the phenomenon of amphibian evolution. Could it have been "foresight" into the coming climatic changes in which great bodies of earth's surface were commencing to dry up? It is indeed curious that there does

exist/...



exist in living creatures to-day an unexplainable awareness of coming changes in the natural environment. This is exhibited by rats leaving man-made constructions before disaster and barbel, or large fresh water fish, leaving deltas and struggling distances overland sometime before the advent of destructive floods, which latter the writer himself has witnessed. Examples of such premonitions are not uncommon in nature and old timers shrug it off with the remark that "they know," though possibly in the case of rats a special sensitivity to earth vibrations.

It is recorded that throughout the advance of evolutionary history, vast natural upheavals and climatic changes have occurred with extensive effects, as for example during ancient glaciations and climatic alterations. The cooler and drier Miocene climate of about twenty five million years ago, for example, brought about the replacement of forest by open grassy plains and savannas, which stimulated the evolution of horses and other running animals. It is still debatable whether the human line had diverged sufficiently from ape-like ancestry for climates of that time to have had a marked influence on subsequent developments, since most of the characteristics of Homo seem to have evolved well within the Pleistocene Epoch, which commenced no more than about two million years ago. It is known that the vast earth upheavals of the Jurassic Period of one hundred or so million years ago, actually extending over a period of about forty five million years, laid low the bellicose life style of the dinosaurs. Similarly in the world of to-day, millions of years later, man could seriously be threatened by radio-active fall-out, created  
by/...

by himself and not by natural causes. The evolution of a highly specialised brain has its dangers, with the problem "nowhere else to go" the stark realisation that has to be faced up to.

The evolution from fish through to mammals is generally regarded as a critical stage in evolutionary history, also the evolution of primates in the Tertiary. Ewing has said (1985), "There can be no question for a properly informed person of denying the evolutionary theory, but only of considering whether it is adequate by itself to explain the striking appearance of design ..... without design the evolutionary process would never get started at all. Nor, even granting that this miracle had occurred, could the evolutionists claim that they had been altogether successful in removing the antecedent improbability of such an extensive adaptation as is in the fact shown by experience." Ewing further states that some thinkers would regard it as adequate to postulate an unconscious purpose to explain design, but it is extraordinarily difficult to see what such a thing as an unconscious purpose could be, and in fact quite unintelligible. All in all the argument from design is supportive of a Creator organising and maintaining continuity (homoeostasis), once the still imperfectly understood origin of some organism, (that also had in itself the capacity to initiate its own movements), had been set in motion, but is not explainable by physical laws.

Young has stated (1978), that all men and women are apt to demand explanations and meanings for life, but in this work

the/...

the subject does not come in for further speculation on the nature of origins beyond the known and understood facts of evolution, such as the wealth of evidence behind the gradual evolution of man. When asked such a question how did man possess such useful appendages as hands, Aristotle was reported to have replied, "It is because man is the most intelligent animal that he has got hands."

It is not advisable to plague ourselves with too many abstract questions. Lord Rutherford in fact once observed, "Don't let me catch anyone talking about the universe in my laboratory," and Julian Huxley is quoted as remarking that evolution occurred "with no more purpose than rain falling from the sky," and that seems a very natural way of regarding evolution.

Summary of Chapter One

This chapter discusses aspects of the dawn of life, with emphasis on the direction life evolves in the case of man. In this connection the expanding neuronal brain from that of the earliest known man-like creatures to modern man is exemplified.

There are hints that within this process of expansion and emergence, there exists direction and purpose. In other words, the eventual state of mental autonomy must have existed in rudimentary form from the time of the very earliest hominids, and to have continued through change over a considerable period of time.

One is led to conclude that this emerging process, particularly exemplified in the case of mind, has resulted from the corresponding evolution in the brain of discrete patterns of nerve cells taking place in a continuously enlarging brain volume which is depicted in Figure 1.

References to Chapter One

- Broom, R. (1937). On Australopithecus and its Affinities, Early Man: International Symposium. Acad. Nat. Sci. Phil., p.p. 285-292.
- Tobias, P.V. (1965). Australopithecus, Homo habilis, Tool-using and Tool Making. South African Archaeological Bulletin. Vol. 20, p.p. 167 - 192.
- Young J.Z. (1971). An Introduction to the Study of Man. Oxford and Clarendon Press, p.3.
- Hamlyn, D.W. (1984). Metaphysics. Cambridge University Press, p. 148.
- Goudge. T.A. (1965). Another Look at Emergent Evolution. Dialogue, Vol. 4, No.3.
- Rideau, Emile (1965). Pere Teilhard de Chardin, A Guide to his Thought. Collins, London.
- Haldane, J.B.S. (1932). Science and Ethics. The Inequality of Man. London, p.113.
- Ewing, A.C. (1985). The Fundamental Questions of Philosophy. Routledge and Kegan Paul, London, p. 228.
- Young, J.Z. (1978). Programs of the Brain. Oxford University Press, p.31.

CHAPTER TWO

EMERGENCE AND DEVELOPMENT OF CONSCIOUSNESS

AND SELF-CONSCIOUSNESS

Descartes is credited with initiating what modern philosophy understands by the term consciousness. The famous Cogito, ergo sum referred to a subjective tendency and had the advantage of bringing out the absurdity of behaviourism as a philosophy, that is, substituting the concept of behaviour as explaining away mental events. Cogito established a permanent subjective self according to Descartes, but all it really establishes is the present existence of a thought or experience. Had he used it as a starting point, modern philosophy is of the opinion he would have been on safer grounds, because what we cogitate might be just a mental image of my imagination, such as a unicorn.

With the theory of the emergence of mind, consciousness is regarded as commencing in a rudimentary fashion far back in the hominid line, even to Homo habilis with his near seven hundred ml brain being conscious of an enemy on the far side of the hill, though he could not confirm it right then with any of his senses, but merely because he had earlier seen the enemy approaching in that direction. As a matter of fact many animals have this state of elementary consciousness, which has emerged in the course of self-preservation, and is a very remote form of Descartes' subjectivity, substantiating the theory that consciousness goes back very far indeed in the evolutionary scale. It would seem that inherited training of the brain neurons has been an important factor in the development of

consciousness/...

consciousness in its non-subjective form. It could be mentioned here that dispositions need not be conscious. For example, anger could still be smouldering in a man even though he has forgotten it for the moment while enjoying a humorous show. Descartes regarded animals as "soulless machines," though he is not always consistent on this issue (1983). Such beliefs are speculative and any degree of fact can be claimed only through a study of the implications of evolution. Teilhard himself was convinced that the effects of consciousness go back a few million years. He explains the fact that the kernel or Ego is divisible and transmissible because there is some sort of psyche in every particle which is at the same time associated with infinitesimal centres of the universe. This amounts to saying that matter itself is involved in consciousness, otherwise the material universe would be completely inert. J.B.S. Haldane also believed that consciousness must be in matter.

It seems therefore that consciousness in its ultimate meaning is metaphysical. This is not unreasonable when we believe that matter is likewise metaphysical, that is ultimately so, or at the beginning. Therefore, life in any form moves along with consciousness in a mystical union. A further mystical belief could be that man's relatively rapid brain development thousands of years before he was able to use it to much extent, was in readiness for him to achieve that higher stage of subjective consciousness and reach out to the cosmic, which as de Chardin believes, has a primordial disposition.

Consciousness in general can be defined as the state of

a/...

a person in which the brain-mind complex allows experiencing and thinking, and which ability has gradually emerged from the primordial to the present high state of subjective awareness. Merleau-Ponty believed in the essential subjectivity even of time, that things surely existed and events took place before there were any conscious beings, and the same may well be true after conscious beings have ceased to exist (1962). Merleau-Ponty states that there is no access to reality other than what the mind reveals to us in consciousness. "Nothing will ever bring home to my comprehension that nebula that no one sees could possibly be," emphasising the primacy of the present and of perception, and he further observes that time is a function of our own consciousness, a philosophy which brings into focus the place of body in our consciousness and what that makes possible as regards our knowledge and understanding of others. The very fact that we have conception of past, present and future, is because of this subjective view of time.

It is maintained that the perpetual struggle to preserve life against the dangers of the environment, needing cunning and resourcefulness around the clock as it were, was a tremendous incentive to the emergence of mind, which is defined as the system of neural operations arising in the brain during conscious experience. It has also to be pointed out that observation also applies to activity other than physical, namely on an a priori factor or organising activity without which there would be no intelligible object, or thing-in-itself lying behind the complex of phenomena constituting the nature of man (Kant).

The living of life is a natural process and the  
occurrence/...



occurrence of consciousness within that process an aid to its effective struggle in promoting the ability to pursue that struggle successfully. As will be observed further on, subjectivity evolved later in the process of development of mind is directed mostly to moral and aesthetic conceptions and is very much less concerned with the harsh realities in the "struggle" for existence, that is, a "sharpening of wits" by the conscious surveillance of the environment. Of interest is it to note that consciousness, as claimed by some researchers, is asymmetrical, with the left hemisphere playing the greater role, illustrating the theory that mind could have emerged from the neuron structure of the brain. The left is believed to be that concerned with verbal activity.

Consciousness of the dangers of the environment and the need for that environment to support life, induced implemental activity even as far back as the age of the Australopithecines, and even earlier as observed by experiments with chimpanzees, such as the use of leaves for drinking tools and other devices in modifying natural objects. In other words the growth of a primitive culture is closely associated with the emergence of consciousness in mind, using culture as a non-verbalised system of early tradition. In all this development, as outlined by primatologists, a process of conscious learning is involved, rather than genetic or instinctual, as Tobias believes, (1965), implying that consciousness in its early stages has gradually evolved collaterally with brain development. The odd feature about such a claim, however, is that Neanderthals of several tens of thousands of years ago, had slightly larger brain volume than man to-day, an explanation earlier offered that neuronal connectivity is vital to the emergence of mind. Young states

(1978) that if the brain has evolved slowly it seems likely that human society, language and consciousness emerged gradually too. It seems that for the Neanderthals there was a "hold up" in mental emergence, the bitter glaciation problems of that time having a possible influence.

Heinrich Falk (1967) quotes the official Marxist-Leninist view of human consciousness as being an immaterial quality, an immaterial product and immaterial function of the most highly organised matter, namely the human brain, or more profoundly considered, the "inner condition of matter." This contradiction of consciousness has also been logically defended and regarded as a serious breakthrough in the traditional position of materialistic monism. Thus, the fact that consciousness, despite its qualities of immateriality and spirituality, is nonetheless a "particular instance of, a product and function of matter," that is, in its most highly organised form of physical brain. Particularly important is that Marxist Dialectic demonstrates the "utter superfluity of the existence of God," the primacy of matter and its inherent power in itself, not Creator given, and that spirit is really liberated matter. This primacy of matter has the power of autonomous self-motion and self-evolution to higher levels of being without the need of any higher cause, a belief which seems to be rather confused with entelechy, or Aristotle's term for inner purpose in which God sees to it that matter everywhere is internally formed, as for example mind over body and designed for its respective objective. According to Aristotle, also, nature makes nothing in vain, that is, an outside agency being behind evolution.

Marxist materialism does not explain how the primacy of matter is maintained, nor its power of an autonomous self-motion and self-evolution to higher levels of being without the need of any higher cause, rather like placing the cart before the horse, or the blind leading the blind.

In the present work we are, however, more concerned with temporal succession of phenomena rather than their causal dependence. Such is an attitude between Marxist resolution of consciousness, that is, consciousness emanating from matter (the brain), and Teilhard's rather mystic claim that consciousness is "likened to cosmic qualities which, to a certain extent, are realised everywhere, and that every least corpuscle from the beginning already possesses a "within", a centre of its consistence, an "infinitesimal consciousness."

If one goes back to earlier philosophy, the German philosopher, F.E. Beneke, called up psychology for an analysis of complex mental experience, but mostly what that amounted to was to fill the gaps that could not be explained by the free use of the "unconscious, postulating a substantial mind, which stands behind the facts of consciousness and controls and arranges them."

In fairly modern times, unconsciousness was believed by neurologists to be solely due to cerebral anaemia. On the other hand, more recent research still has a very different view, namely that there is somewhere in the brain-mind complex "a kind of switch blocking and unblocking awareness" (1979).

Consciousness thus cannot be a property of neurons as such. It was found that manipulation of the anterior wall of the third ventricle, that is, the central space in the brain, also had the same all-or-nothing effect on consciousness. Tumours of the thalamus, a group of cells at the centre of the brain, and the hypothalamus, the region near the base of the brain for ensuring homoeostasis, that is, the disposition of living things to maintain a steady state in spite of changing conditions, such tumours may also cause unconsciousness, possibly by indirect effect.

The suggestion has also been made in neurology that consciousness is a function of discharge patterns, rather than discharges as such, suggesting an induced change in brain rhythms. A person can respond to a stimulus like bad news, but faints only a split-second (less than half a second) later, indicating that electrical brain connectivity through neurons is responsible for the minute delay.

Another feature of loss of consciousness, is that it can return slowly. Hypnotism also affects normal consciousness, when man's awareness can be influenced into losing its structure and a loss of "generalised reality orientation." We shift forward on waking from sleep also, and slip back into it when falling to sleep, both under nature's orders. In fact anything which depresses the action of the cerebral hemispheres causes defects of consciousness as well. The abovementioned hypnosis is said to be really no more than an "altered" state of consciousness, a mixture of both consciousness and unconsciousness and the mind remains in a "peculiar physical state"/...



state" and open to suggestion. Even Sigmund Freud took up hypnotism, though the records show he was a very poor hypnotist.

Consciousness is a state of the mind-brain complex existing in varying degree amongst animals and reaching its highest in man with his capacity for self-awareness. The implication is that it has evolved as an organised process of brain activity and capable of subordinating neuronal activity. Unconsciousness is the cutting off of this process by such means as tampering with certain vital brain areas as indicated earlier, or simply a blow on the head, or clinical means. The abovementioned higher consciousness or self-awareness in man is regarded by some metaphysicians, such as Herbart and Lotze, as still a substantial state, that is, a very real mind state, the ideas which "cross" our consciousness being "the effects whereby this real state preserves itself in its interaction with other existences." The very unity of consciousness is also the fact of the existence of a substance possessing definite ideas, feelings and efforts.

Emergence of mind is due (not totally due) to the evolution of neuron brain which in its higher reaches became capable of contemplating the aesthetic. In specifying not totally due to physical brain, earlier comments on the metaphysical nature of matter can be recalled, namely that it is a word useful only in common speech as a general term for the materials of the universe, of which in the present age physical science has made a detailed analysis into ultimate particles and forms of energy, with remarkable results. The other view is

that/...

that mind has emerged from matter, the critical breakthrough being the rise of self-consciousness, as Teilhard states. Should such be established by the introduction of some new factor unknown presently to physics, an element of uncertainty is introduced.

The difficulty in establishing any hypothesis concerning mind, is that we are not aware of our own neurological processes. They just happen, but the backing of the theory of emergent evolution from Australopithecines to contemporary man, fortifies the belief that mental states have evolved with the evolution of countless millions of brain neurons. Eccles, while clearly expressing the a priori factor of mind, also holds the possible view of emergent interactionism of body-mind, and such a belief is not based solely on causal connections.

Eccles restricts the use of the term mind to conscious mind (1951), that is, in all its general operational field of perceiving, thinking, willing; and only when there is a high level of activity in the cortex, (as revealed by the electroencephalogram), is liaison with mind possible. When this is lowered as in concussion or sleep, unconsciousness supervenes. This demonstration is of extreme interest and must have similarly occurred in man even with his half-size brain, or even less, when he was emerging from an ape-like stage.

Sherrington believed that mind, (in his definition conscious mind, is a non-sensual concept) has remained unassimilable into the matter-energy system (1940), but as has been pointed out earlier, this belief has frequently been questioned/...

questioned by arguments which are largely speculative in postulating a fundamental linkage. Eccles, later than Sherrington's work, raised the interesting contention that mind does enter into liaison with neuronic brain in special states of the matter-energy system of the human cortex, though he remains unsure of what happens in animals of a lower order than man. For this liaison to function and work (as a detector), there arises a sensitivity of a different kind from that of any physical instrument. Eccles' hypothesis, therefore, is that mind achieves liaison with the matter-energy system of brain by exerting spatio-temporal fields of influence that become effective through a unique detector function of the active cerebral cortex. This cortex has been with man since the beginning of his evolution, but as Alfred S. Romer of Harvard observes, the further evolution of the cerebral hemispheres was "the most spectacular story in comparative anatomy."

It is popular to refer to early man's inborn instinct, a word which Young defines as vague and now little used by biologists and a "dangerous concept," in fact. Rather should our activities, including a part that is heredity, be referred to as instinctive, or instructive components of behaviour, though this is not entirely correct because a part of our behaviour is learned, though it is still uncertain how such learned patterns do work-in with heredity. The learning of language is an example which involves such combination with those basic patterns already produced by neuronic cells. Such a capacity no doubt has become "second nature" since man evolved into the full cultural age at least about two hundred thousand year or more ago, whereas early man regularly began to employ symbols/...

symbols to indicate actions of other people to refer to themselves, known as symbolic representation of the self. Of course physical developments also had to take place before language could be expressed, such as the forms of the pharynx and palate as well as the tongue, which indicates that the "capacity" for speech began to evolve in the time of Homo erectus, or even earlier.

To-day the brain of the new-born child has such capacity ready made, not only physiologically but mentally as well. In this way the new-born very quickly gains a model of the outside world before speech. In the course of growth this store of knowledge is conserved in the brain and the picture the child gains is transferred to himself as belonging to himself and he becomes conscious of himself and of his place in the world in a very real way. Such a process results in a person becoming an entity to describe the outer world and in so doing finds he is describing it as a self-entity of which he has become aware. It is from the standpoint of this self-made self that he is able to convey his thoughts and impressions of the world around.

The feeling of self-hood is one to which much importance can be attached, even the word "ego" being considered appropriate because it has acquired so many other connotations. Nathan Leites in his book on the ego refers to the general looseness with which this term is employed. Here we do not refer the ego to Freuds' "executive function," but as the very subjective self one's true identity of self-hood, which basically is the product of neuronal patterns, an hypothesis which is stressed frequently, and can even be demonstrated

by/...



by the fact that methylene dioxyamphetamine is reported to strengthen the ego or feeling that "I am I" and not because of the weaker catholic inspired hypothesis of the disruption of sense.

Ewing has dealt extensively with the conception of the self and refers to the substance behind experiences as the Pure Ego (1985), a state of which we are immediately aware, which may be an unanalysable relation between our experiences and doubtfully representing the quality of a substance itself, in other words, not necessarily identifiable with its experiences. Ewing points out that the problem is "one of the hardest in philosophy."

Differences in expression of the basic self, such as in personality, can possibly be justifiably accounted for by heredity, learning and life's experiences in varying environments.

When early man profited by prior experience and made it a way of life he began to show intelligence, such as that of an ape learning to rake food into his cage with a stick. This capacity, if habitually exercised, could be inherited and become a passed-down way of life. In the same manner consciousness or suspicion of danger in certain situations, can be incorporated into brain neurons as a hereditary factor, becoming more complex and advanced as evolution proceeded, continually providing the evolutionary "back-up" of new capacities emerging. An example of such complex advance can be cited in the case of Proconsul,

an/...

an ape-like creature of the Tertiary that became adapted to living conditions and all its dangers out on open grassy savannas.

Eddington in "Science and the Unseen World" draws attention to the mind's astonishing feat of deciphering the stimuli transmitted along nerves, strange coded nerve signals, into natural knowledge. If this is a feat beyond our comprehension, how far less understandable is it that we should comprehend what lies at the end of the nerve lines of communication about the self. But we do know it, because the self is the mind, the first and most direct thing in our experience, knowledge of which according to Eddington, transcends the methods of physics. For Eddington, also, substance melts into shadow, and so remains an unknown quantity. How less, therefore, can one hope to comprehend consciousness of the self, illustrating the fact that it is from the side of physics that the foundations of materialism have been most seriously undermined. Matter to-day has become infinitely mysterious and infinitely attenuated. We know a lot about the physical world to-day, for example, how a thing functions, but nevertheless not what such a thing really is. "If to-day," Eddington says, "you ask a physicist what he has finally made out the ether or the electron to be, the answer will not be a description in terms of billiard balls or fly-wheels or anything concrete; he will point instead to a number of symbols and a set of mathematical equations which they satisfy."

How futile indeed does it consequently seem to attempt to evaluate mind or self-consciousness. In view of the physicist's revelations the sole course would be one of

agnosticsm/...



agnosticism concerning the nature of matter. But what of mind, awareness, self-consciousness which belong to each and everyone of us, even more so than matter? Science could treat the mind as if it worked like a machine or a computer, as is currently fashionable, but of course a philosopher would see the absurdity of this, one of the primary reasons amongst many, being that experience, has no identity and no consciousness of itself as such. The sense of identity in itself is one of the most enigmatic of all the phenomena of mind, or what William James called it, the most "puzzling puzzle."

At present no attempt has been made to seek a definition of consciousness beyond that it is the state of a person in which the neuronic brain allows experiencing and thinking, mainly the latter, since the only benefit philosophy can draw is to point to the contingency and contentiousness of every man-made theory and draw the epistemological, ethical, metaphysical and logical conclusions.

One has to acknowledge that there exists an element of mystery in the workings of nature, for example the greatest mystery is the phenomenon of life itself and in particular that of the human mind. That mystery remains even if it could be conclusively shown (which it cannot) that it has evolved from matter. Above such, another mystery exists, namely what is matter? It is but a man-made concept of different meanings all of which continue to be controversial.

Lonergan wrote, (1958), "One cannot deny that within the cognitional act as it occurs, there is a factor element or component/...

component over and above its content, and this factor is what differentiates cognition acts from unconscious occurrences." By consciousness, Lonergan means "an awareness immanent in cognitional acts." Another belief of his is that "conscious acts are not so many isolated, random atoms of knowing, but many acts coalescing into a single known," indicating a single field of consciousness.

William James was fond of the phrase "stream of consciousness" in defining mind. One can see, however, how this fails when one notes the occurrence of states of unconsciousness. If we assert that the "stream" continues during states of unconsciousness, then one faces the problems involved in the substance theory or pure-ego concept. Be it recalled that Descartes view of the mind is that it is an enduring, immaterial, non-extended thing that undergoes changes consisting in the performance of various acts of thinking. Actually, the concept of mental substance in earlier philosophies is rather unclear, as indeed many more recent expositions on the nature and property of mind likewise suggest. Furthermore even the brain is little understood despite the tremendous increase in our knowledge of how it works which has been achieved by neurological experiments, such as removing parts of the brain and stimulating directly parts of a conscious patient's brain. The mind-body relationship, which remains such an "acute discomfort" to philosophers, will be reviewed later. Goudge of Toronto University, believed that if such a study were conducted in terms of the mental-neural network systems having an array of functions, instead of in terms of mental substance and physical events, a fresh approach could be achieved, though he appears to overlook the fact that such a philosophy has really/...

really been with us a long while. Bertrand Russell, (1948) did try to work a philosophy in terms of science, but finally came to the conclusion that the entire world of physical science was a "speculative construction" built on the foundation of consciousness.

One is inclined to believe that the whole issue involved in mental emergence has become so complex that, in the words of Scriven, "it is the creature that is intelligent and not the brain," which latter, science so assiduously studies.

Ewing (1985, loc. cit. p. 110), states the possibility of the distinction between two senses of "conscious" in order to avoid confusions. By "conscious desire" may be meant a "felt desire," which means that all our experience need not be conscious. For even the most introspective person is not introspecting all the time, and when he does introspect he does not introspect every element of his experience. There is always something more beyond what we explicitly notice in our introspections. It may therefore, without self-contradiction, be supposed that we have desires which are felt as elements in our experience making their contribution to its whole tone, but are not selected and identified consciously.

The idea that the past and the future (as far as it may be surmised) leads to the concept of the distinction of temporal form of consciousness (1984), (the past and the future being secondary to the present for consciousness as we know it), is a belief which is behind Merleau-Ponty's "primacy of the present." The past is no longer "lived" through and the future may not

be/...

be lived at all. People with brain damage may have no memory to live in the past, which after all is only done in a derived sense. The real thing is consciousness only of the present.

Every psychic phenomenon in consciousness is an act which refers to an object beyond its own consciousness, but the object remains immanent in consciousness, for it is not merely a target for which intentional awareness aims. There can, for example, be no consciousness of hearing joy without some object with which one can be joyous. The psychical phenomenon or act is the secondary object, while the phenomenon to which it refers, that which appears as if it were external to consciousness, is the primary object. Brentano in this way, transferred significance from the primary object to the corresponding psychical act.

A definition of consciousness largely upheld by Husserl, whose Phenomenology represents an extension and transformation of Brentano's attempt to work out a logical geography of mental concepts, is that it is a state housing the essences or essential structures of phenomena represented or exhibited therein. It is in the intentional act of consciousness that the world acquires meaning and reality. Reality is disclosed through the transcendental Ego within the realm of consciousness. This amounts to saying that consciousness is a state which determines objectivity of the external world, the reality of which is not denied.

The view expressed in the present work is not that the problems arising in the emergence of mental phenomena can be understood/...

understood by reference to orientation with neural activity. The emerged mind has quite obviously reached a level transcending analysable phenomena of neural transformations, to a level of mystery and obscurity. Nevertheless, it is believed that the concept of emergence is needful to the whole concept of the philosophy of mind, reasons for which this work attempts to present.

Professionals bear testimony to the need for orientation with neural research. Sir Henry Cohen for example, states (1952) "there is no specific attribute or mode of functioning of the "ghost" (Ryle) by which we can recognise its misdeeds ... for there is no thought in man that cannot be disturbed or destroyed by disturbance or destruction of the brain." On the other hand, Cohen does caution further on, that such statements as brain activity causes mental phenomena, could be senseless as a bald statement. Sherrington, also, is quick to remind us that "the step from electrical disturbance in the brain to the mental experience is the mystery it is," the mind adding the third dimension when interpreting the two-dimensional picture (1940 loc. cit. p. 116).

Goudge, a supporter of orientation of emerging neuronal brain with mental phenomena co-emerging, points out (1976) that "a long, complex process of organic evolution has occurred on the planet resulting in immense changes in living things .... mental phenomena have undergone changes from simple to complex and from homogeneous to heterogeneous forms. Such changes constitute/...

constitute an essential feature of mental evolution." Goudge indeed goes further to quote proof of the fact that "mental phenomena cannot exist in the absence of the functioning of sense organs, nervous systems, and brains." There is, for example, the recent discovery that a sub-cortical region of the brain known as the brain-stem arousal system, plays an important part in determining mental activities in humans, and is also thought to account for some intellectual processes, and what is significant is that this brain-stem region is phylogenetically older than the cortical region and is a more "primitive" structure which man shares with other animals who appeared before he did on the evolutionary stage. This adds support to the possibility that mental phenomena occur in animals, whose central nervous systems are a good deal simpler than the human central nervous system, with corresponding simplicity in mental phenomena.

The above points to the hypothesis that man's mental processes existed in a less developed form in such ancestral beings as Australopithecines or some collateral group. This hypothesis is supported by Rensch in his book "Evolution Above The Species Level" published in 1959, and also "Biophilosophy" in 1971.

Taylor has outlined brain connectivity as follows (1979 loc. cit. p 272), "There are six layers in the cortex, and even six such networks have fantastic discriminatory and integrative powers/...



powers, as von Foerster (Heinz von Foerster, Urbana, Illinois) has shown. But in each of the six layers are many cells ranged above one another. We should probably think, therefore, not of regular layers but of numerous folia dissolving into one another. And as the connections and thresholds shift, functional networks will appear, expand, contract, join up, separate and vanish within the structural network. That is a concept of the brain of such power, of such potentiality as to defeat the imagination. And when we elaborate it further with the ideas of anelectrotonic conduction and magnetic fields, we have an instrument which could well be capable of the intricate ballet which we call human thought."

Is such a miracle of evolution capable of mind as well, and how is such associated mind involved with neurons in the brain? Eccles, has declared that "for every mental event there is a unique brain state." Further, what is the relation between consciousness and brain neurons? Does it not become apparent that in that centre in which Sherrington's "great multitudinous creative dance," the brain, there is also the creativity of mental events? Pribram, however suggests the possibility (1969), that "nerve impulse patterns per se must be unavailable to awareness."

The crucial area for consciousness appears to be the swelling of the brain-stem, known as the pons, according to Taylor (1979 loc. cit. p. 75), the pons as described by J.Z. Young being the band of tissue below the cerebellum,

containing/...

containing many important groups of nerve cells. Verification of this possibility would confirm that mental processes do arise in the brain; in fact Young categorically declares (1978 loc. cit. p. 193) that "Without a brain there is no thought." Later in his publication, Young describes how the brain operates in thinking (loc. cit. p. 204) "The process," he says, "involves the motivations for search and exploration, including functions of the frontal lobes, the perceptions of the sensory cortex, the study of relations by the association cortex, and the satisfaction of achievement, that are linked ultimately with those life promoting activities of the hypothalamus and reticular system that are at the centre of consciousness."

The fact of centralisation of mental phenomena, such as consciousness assymetrical with the left hemisphere as referred to by Smith (1984), and musical stimulus with the right hemisphere, suggests an intimate role of brain neurons in the giving forth of mental phenomena.

Various experiences in the course of living bring consciousness and awareness of the self into focus, as it were, and is recognised by the fact that a child is not fully developed until the age of seven years. The way it has been put is that the child has to learn to describe himself as if occupied by another person, me. Or to put it in another way, the "world" as we describe it has a reality outside of ourselves, and there is a form of "duality" established, me and the outside world. Consciousness of the outside world in

humans/...

humans, even with the highly prepared brain, has to be inculcated in the early stages of growth.

From the above, the implication is that consciousness is an allied state of the brain and mental phenomena are caused by some event, the reverse not being true. The learning of the young child indicates that the mental event (consciousness) came after the brain event. This is by no means a new concept in philosophy. For example, as long ago as the publication of "The Human Machine" in 1748, the French Philosopher, Lamettrie, endowed matter with the power of acquiring motor force and sensation, and of matter being able to "think", implying that consciousness arose out of matter. His contemporary, Holbach, presented the materialistic standpoint in a much stricter form by stating that mind is simply body regarded under the aspect of certain functions and powers. The difference now held is that matter evolved in its potential, and handed on in evolution mental capacity, because in Pre-Cambrian times mental capacity did not exist, whereas matter did. Where did mental capacity come from? Surely through matter to mind, through neural changes in the brain in the course of evolution. In the course of time millions of years later consciousness and awareness of the self became merged into the living cells of the body. This view is further considered because there seems no logical alternative to it, except the emergence of mind in matter, and its enormous later development furthermore. In its higher ranges it is this development which has distinguished persons from the rest of nature, by persons meaning self-conscious, as well as conscious, beings.

The above does not imply that mental items are "identical" with physical items, or that we can explain everything that has to do with the so-called mental side of human beings in terms of internal systems which have a certain functional role in the economy that makes up that human being, such systems having a purely physical realisation. The first of these theories, that mental is just one version of the physical, has given rise to currently fashionable materialism. The second thesis is known as functionalism, also a currently fashionable thesis among materialists, rather submerging personality, and plunging man into uncertainty.

It is interesting to note that Teilhard de Chardin maintained in his work "The Phenomenon of Man" in 1955, that all constituents of the cosmos, from elementary particles to human beings, have "a conscious inner face that everywhere duplicates the material external." Goudge concludes (1967) from this, if it can be substantiated, that physical evolution of the cosmic stuff will at the same time be an evolution of consciousness. The more highly integrated a material system, the more developed its psychical interior will be. Thus in the human brain an intense concentration, or "involution," of cells has led to the emergence of self-conscious thought, the most advanced stage reached by evolution thus far. This evolved capability is so unique that it moves into the realm of psychical phenomena. According to Ayer (1982) the "psychic factor," which is assigned an indeterminate status as between mind and matter,

is/...

is credited with the power to enter into various compounds and to carry the traces of previous experience. The possession of it would not guarantee personal survival, though it might contribute towards it.

Quite possible is it, that man's unaccountable and relatively rapid evolution of brain capacity, gave him the lead in acquiring the psychic factor, most likely as far back as the late Pleistocene hominids, with their already superior brain.

Popular opinion would scarcely agree with crediting consciousness to the early Australopithecine family, even less any consciousness of the self. But the fact that they did make tools, had an upright gait and had clubs, using the reasoning capacity of a brain of four hundred and fifty ml. At the same time, one has to consider that brain weight-gain is not a simple happening relative to neural ability. An elephant's brain is three to four times larger than the human brain and a whale's can be six times heavier. The fact is that the internal complexity of the human brain is so much more exciting, with the "silent" zones very little explored. "Within them," says Smith 1984 (loc. cit. p.29), "lies most of mankind's wisdom, imagination, forethought, compassion, and a very distinctive lust for life, art, thought, invention and despair." The significant point is that all this arose from the elementary nerve network which is traceable through fishes, amphibia, reptiles, mammals to man, very suggestive of evolution with a "purpose," a destination destined from the very start millions of/...

of years ago.

The question may very well be asked if man is unique in this respect with his spectacular evolution of the human brain, Sherrington's "enchanted loom," a phenomenon which Groch declares (1964), still to this day keeps its ability to think as a "tightly kept secret," with a follow-up reference to the "long and tantalising quest for the seat of mind," concealed among such functions as memory, learning, intelligence, and rather too fluently attributed to "activity" of brain cells. Ayer (1982 loc. cit. p 186) nevertheless states that "there is strong evidence that states of mind are causally dependent, in a general way, upon states of the brain, in the sense that the operations of the brain are necessary for their existence."

Hume regarded mind as consisting of two kinds of perceptions, those we call sensations, feelings, emotions (impressions) and those called thinking (ideas). The former are forceful and vivacious and the latter nothing but fainter copies of these, such as images. The objects of our thoughts are conditioned to what we have experienced or might experience by inner feeling or inner senses. In tending to reduce everything in the brain-mind complex to feelings, he escapes the mystery of what consciousness really is, though there is a tie-up for example with the phrase that conscious desire could readily mean felt desire, as Ewing points out (1985 loc. cit. p. 110). It does not stipulate that all our experience must be conscious  
(e.g. introspection/...

(e.g. introspection or "unconscious desire") as against experiencing desire, in which case Hume could be hot on the trail of the nature of consciousness, even though none of his important contentions is based on field work or experiment and rather on appeals to what we already know. It is intriguing to theorise how early and middle eighteenth century philosophers, such as Hume, would have handled problems with contemporary neuroscientific research to-hand, or with the perspective of emergent evolution before them, bearing in mind of course, Ayer's belief that philosophy itself has had indirectly an important effect on the sciences. Science cannot take the place of philosophy, but actually gives rise to philosophical problems. It cannot even demonstrate, though it must assume, the very existence of the physical world, or whether the universe has purpose. In fact Whitehead is reported as having declared that "there can be no successful democratic society till general education conveys a philosophic outlook." (Ewing loc. cit. p. 14).

As has been stated, the evolution of culture was gradual and the product of a long evolutionary process linking modern man with proto-human and pre-human ancestors millions of years ago (Goudge 1964). The progress towards culture, accelerated increasingly over the past two hundred thousand years, indicates that man was averse to sinking into indolence, and, secondly, that the challenge for survival stirred him into ever more sophisticated mental activity. This latter aspect no doubt induced a more sophisticated neuronal brain, and as stated  
earlier/...

earlier, with greater electro-chemical connectivity.

It is both the basic "urge" and the "development," the former still shrouded in mystery, and the latter connected with meeting the challenge of existence in human life-style, that have evolved mental capacity and a realisation or consciousness of the value of the self as an entity. In primitive times indolent and incompetent people were eliminated, a fact which promoted the forward move of society. This process of survival of the fittest made it possible for heredity to pass on progress in culture, and inculcate future generations with ever-increasing cultural standards. This is more or less Herbert Spencer's approach to the pursuit of "general happiness." Later evolutionists regarded this development philosophy as one of an "ape and tiger" tendency, T.H. Huxley in particular, who was opposed to ruthless self-assertion. Rather should society fit people to survive by correct education and correct standards, so that cosmic processes can get on with fundamental inner evolvment. In to-day's civilized world, "struggle" and "natural selection" are rather metaphors, biological evolution being a silent process in which populations undergo changes through certain complex statistically represented sequences of natural events taking place within the body and representing the earlier mentioned development process and governed, as we must presume, by the "urge". Biologically, this process is very slow, though mentally it has, during the cultural age, been rapid. Ernst Mayr in his book "Animal Species/...



Species and Evolution," produced in 1963 and on page 656, quotes as an example the fact that Cro-Magnon man of about thirty thousand years ago, "differs physically from modern man no more than do various modern races of man from each other." In modern culture, what has been of importance is primarily the result of speech and man's ability to transmit non-genetic components. But it is these which have hastened the sophisticated development of the brain, particularly of its dendritic connections. Some of this ability does seem to constitute hereditary components, e.g. a "clever family", but apparently not genius, which is often associated with prodigious memory.

One of the features of rapid cultural advancement has been the fact, as Waddington contends, that each infant has become an "informed acceptor," so that he will be ready to believe what he is told. This has become more accentuated since man began living together in small family groups. At the same time, it has to be appreciated that man in this present advanced cultural age, has evolved the ability to sit in judgement on himself and that involves his capacity for self-awareness, or the ability to think of himself as being in the place of others, consciousness of individuality, in other words. That was not possible in man squatting in the evolutionary tree even in Later Pleistocene times, and yet even geniuses like Mozart, Einstein, "inherited" their brains from a long line of hunter-gatherers. It was the realisation of such a brain's potential about a hundred thousand years ago, which has brought/...

brought man to his remarkable stage in which the brain is not comparable with anything else in the known universe, and the surprising fact is that man is actually not aware of it as such in any manifestation of consciousness, suggesting the rather curious definition that conscious is the state when the brain is unaware of itself. This gives rise to observations such as that raised by Taylor (1979, loc. cit. p. 320) concerning the peculiar "looseness of fit" between subjective experience and the stimuli which give rise to such experience.

There are baffling quantitative aspects of consciousness such as those induced by drugs, or even of awareness or non-awareness of objects present by tricked lighting, or the deflection of light passing through water or another medium of a different density. The fact is that such illusions persist when we know they don't exist, even feel they don't exist such as a bent stick in water. We are conscious of the feeling that something presents itself the illusory way it does, but nevertheless aware that it is not so, suggesting that consciousness of feelings and awareness are not the same thing.

The fact of the matter is that consciousness has to arise somewhere, and neuroscientists have made numerous attempts to locate it, such as those of Eccles, who maintains that it is located in the topmost layer of the cortex. Others like Wilder Penfield locate it in the brainstem or old part at the base of the brain. Other researchers are, as Taylor quotes, Beritoff

("Neural/...

("Neural Mechanisms of Higher Vertebrate Behaviour," 1965) who assigns it to the interneurons. Roger Sperry sees it as a property of the brain circuitary as a whole, and so on.

The above disagreement gives rise to the belief that truth only can be arrived at, not by examining structure, but by a study of consciousness itself. Electrophysiology has been on the search now for about a century, without tangible success as regards the seat of mental capacity, which still remains invisible through all the "brain windows" of neurological research. Young's definition of the brain (1978, loc. cit. p. 266) is a useful guide, namely that it is "a set of nerve cells of immense complexity whose intense activity is continually directed to furthering the life of a particular individual," and for each of us there is a continuous mental flow of experience that we call mental life, or mind. How these two, brain and mind, are thought to relate will be further discussed later. Our main concern at the moment is and has been to discuss the problem, for it really is a problem, in relation to the emergence of mind through evolution, in the hope that this approach will add slightly fresh meaning to one of the greatest mysteries facing philosophy and science. It is merely to this approach, that reference is made, because sufficient is known about the problem that evolution in itself is no more than a study of genetic changes in populations by natural selection and the provision of basic information to survive. Specifically in the case of brain it claims no more than to trace the physical dimensions of this organ, the hypothesis arising from this, being/...



being that the still not understood faculty of mental capacity emerged together with the evolution and development of the efficiency of neuronic brain, and, most important, mental activity has not been an acquisition without a history. It is hoped that such an approach may lead to deeper convictions than those presented by much contemporary speculation not based on historical facts in evolution, though they are instructive.

The idea about the concept of evolution dates back many centuries. "Science in its beginnings," says Bertrand Russell in "The Scientific Outlook", "was due to men who were in love with the world," and that is true of the early Greeks. Their broadness of vision was remarkable, though only given expression often in very general terms, for example that of consciousness as being "everything that is condensed or rarified"air", and the clouds are one of the first results of the condensation of air," a saying of Diogenes, who revived the theory of Anaximenes (1928), the Ionian philosopher of about six hundred B.C. Of course, Anaximenes believed the earth itself was a flat disc floating on air. He did believe, however, there was a tilt to the disc, a premonition of the inclination of the axis of the earth.

Hundreds of years later the opinion retained was that evolution was the way God's design works out, and that for such evolution as that of God's design could not have got started at all unless some original organisms already existed. (Ewing 1985, loc. cit. p. 228).

Mind, having relationship with physical brain, also emerged gradually, even within the early stages of cultural evolution. The discovery of the Swanscombe skull in Kent, dated two hundred and fifty thousand years ago, had mostly modern features and a brain volume equal to that of modern man (Young 1978, loc. cit. p. 38). Neanderthal man, who existed about one hundred and eighty thousand years later, and even after that intervening space of time, with a completely modern-sized brain, was a very doubtful speaker. Lieberman (1971) demonstrated that the forms of the pharynx and palate were more ape-like than man-like. The use of language was rendered possible by evolution of physical forms which accompanied the evolution of speech, such as the above-mentioned physical developments, also the lengthening of the pharynx and the more posterior position of the tongue (Young 1978, loc. cit. p. 186), adjustments required in addition to the development of neuronal brain connectivity.

The production of cave drawings or artistry dating back to Cro-Magnon times of thirty to forty thousand years ago, may be regarded as evidence of a form of self-extension and self-consciousness of "me-and-you," as in hunting scenes.

In connection with the alternation of structures, as for speech, there are some that are replaced, but not dispensed with, there being merely a transfer of functions from older to newer structures, but the older structures, as in the case of the thalamus, a group of cells at the centre of the brain, are

still/...

still there, though this centre, for example, no longer handles vision which latter is now the responsibility of the cortex (Taylor 1979, loc. cit. p 109). It is therefore to be noted that the added refinements of evolution are often "on-call" and are probably going on within man this very day.

Consciousness from all that has been said in the foregoing, is equated with physical evolution and even mental "structures" are superseded but not replaced. Higher levels of consciousness are inhibited by drugs or damage or even self-inhibition, while the lower levels remain functional, which recalls the theory of the biologist, Ernst Haeckel, that all creatures recapitulate their evolutionary history under certain conditions. There are in fact those somewhat stern reminders of man's evolutionary past in noting how human embryos develop rudimentary gills at one stage in the womb. Why, therefore, some may ask, should consciousness not also have a "past"? For human babies the fulcrum of its life is in the limbic systems, the older part of the brain, and when the higher parts are destroyed or removed, rather primitive emotions take their place (Taylor, loc. cit. p. 286). Such behaviour is sometimes referred to as schizophrenia when it becomes a disease. In such cases, a person becomes conscious of being manipulated by malign outside forces (Young, loc. cit. p. 167).

A general objection to the co-development of physical and mental by evolution, is the possibility of the assumption  
that/...

that mental phenomena may be subordinate to somatic phenomena. On the other hand, no one considers the delicate scent of the rose subordinate to the stem. The connection between physical and mental is extremely binding and intimate, as for example the part played by the brain-stem arousal system in determining mental activities in humans, even though it is regarded as a primitive structure. Furthermore, it is doubtful if any mental phenomena arise without the pre-occurrence of a series of electrical and chemical events within the neurons of the brain. Sherrington's "shower of little electrical leaks" conjures up mental events in a manner which still remains a deep mystery, without any hypothesis whatsoever of our understanding of the subsequent "intervention" of consciousness, either of events or of the self. But one fact remains, that brain is pre-requisite to self-awareness, a very profound hypothesis.

Young states very simply that mental states are those in which physical brain "allows" experiencing and thinking (1978 loc. cit. p. 291). It is felt that attempting to establish the ground of the mental world entirely on Sherrington's "electrical and chemical leaks," not only destroys personality, but is one-dimensional and denies the "inner convictions" of the mental world. Eddington stated that uncertainty exists only in nature, not in the mind.

Ayer states (1982, loc. cit. p. 36) that mind and matter are differentiated by the fact that certain elements such as images and feelings enter into the constitution of minds, also by the operation of different causal laws, the latter corresponding supposedly, to Russell's logical constructions.

Moore's/...

Moore's common sense philosophy states that some animals other than man have what he calls performance of "acts of consciousness" ("Some Main Problems of Philosophy", 1953) located in the body and dependent on them, surely an example of radical empiricism, by assuming until further knowledge is available in the case of animals, there is no reason, in the Humean sense, to assume something one cannot confirm or deny.

Broad ("The Mind and its Place in Nature" 1925, p. 219-20) considered that mental elements reside not in the sensing of the *sensa*, which consists rather in their being brought into a suitable relation with the mass of body feeling, but in the effects of past experience which leads us to convert our sensings into particular perceptions, that is, to give the apprehended *sensum* "a certain specific external reference." The existence of "sufficient similarity" in the *sensa* presented to different persons leads to a concordance of their behaviour, though *sensa* in general are private to persons.

There are in philosophy a number of what Ayer calls "dark sayings," and even Collingwood is not excluded when he is reported as saying in connection with self-knowledge (mental capacity), "Not a part of man, but the whole of man is mind in so far as he approaches the problem of self-knowledge by expanding and clarifying the data of reflection." ("The New Leviathan," 1942, p. 11). Locke, on the other hand, struck a more convincing note when he said that to imprint anything on the mind without the mind being able to detect it through the senses seemed "hardly intelligible."

In/...

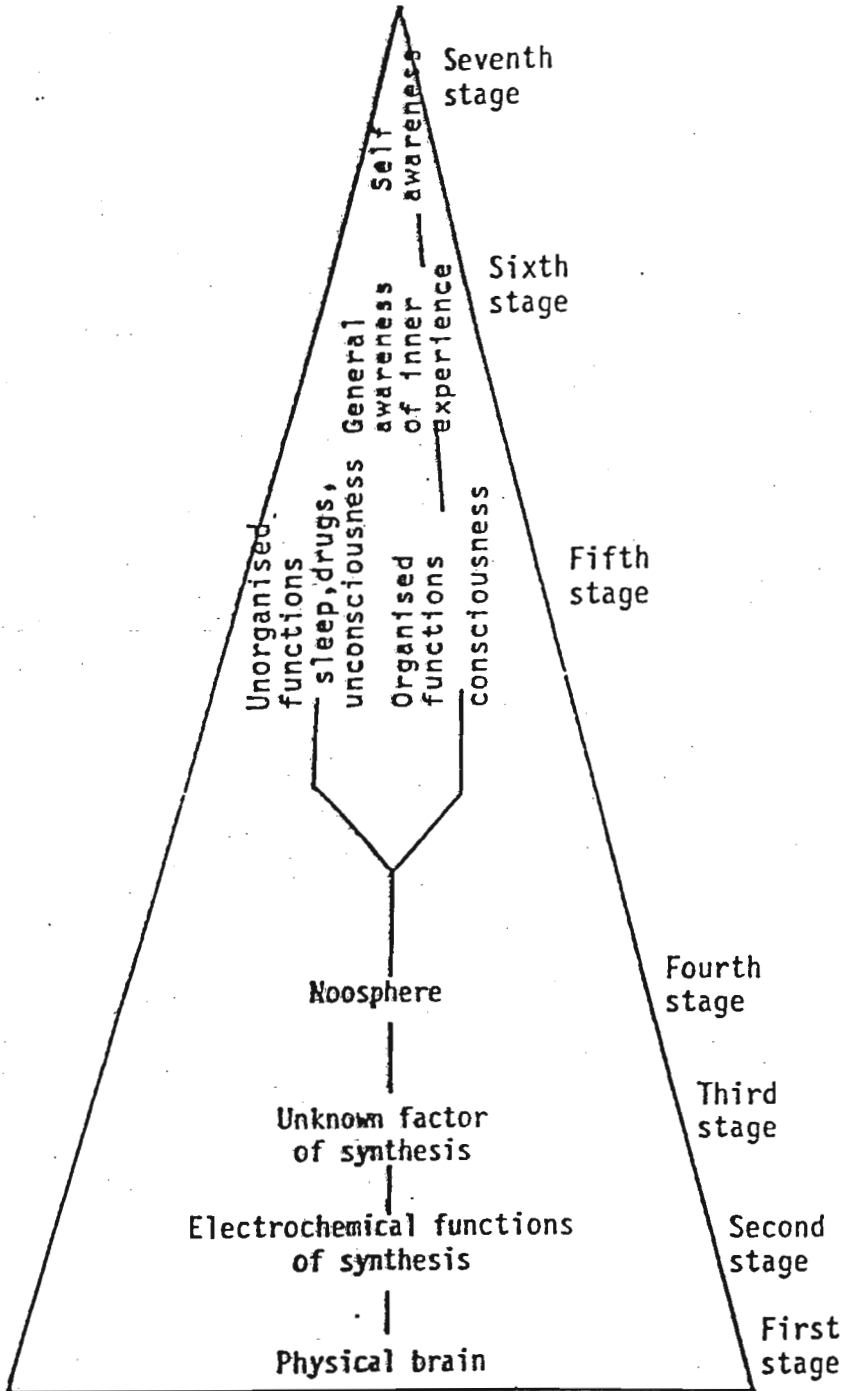


In the history of evolution it would surely be shortsighted to maintain that the neuron network of the brain evolved as a device solely for attaining consciousness. Nature achieves very little without reason and one must assume that the state of consciousness evolved as a means of preserving existence in a more competitive environment. Such a state continuing into the noosphere or fourth stage (Figure 2, page 75), evolved into organised and unorganised functions or fifth stage of emergence. Organised functions of the mind gave rise to general awareness of inner experience and finally in the seventh stage, to self awareness or purely mental entities in association with disembodied existence. It is difficult to visualise the emergence of some substance beyond personal experience and still able to retain some form of identity. If there is such a state as the pure Ego, it cannot be applied to physical substance, hence emergence into the seventh phase (Figure 2) must be regarded as complete severance with matter, that is of a completely different dimension. The point is that emergence of mind commenced as a means for survival in an environment hostile and destructive to those unable to meet the challenge when not with the mental capacity to do so, for example such as inventiveness, reason and so forth. Primitive people had to invent animal traps, prepare artefacts, work out devices and means to outwit wild game, all featured in the third stage (Figure 2) or thereabouts. Did he, a million years or

so/...

Figure 2

Diagrammatic Representation of  
Emergence to Mind



so ago, have a "soul"? According to the theory of emergence, disembodied existence emerged as a natural process through and from matter over many millions of years, the seventh stage being an "awareness" of this stage and a metaphysical yearning for its attainment. Aristotle's conception of the soul was that of a device for explaining what makes something alive. For him, therefore, even plants have souls, in the sense that they have the capacity for growth. The theory that is advanced here follows more or less along those lines, except that this force or capacity for emergence evolved in "thrust" in its higher stages. Plato tends to think of the soul as the real self which may survive the body and thus be immortal, but curiously in those early times of philosophy, there was little place for the conception of mind as something inner and to be contrasted with the so-called external world. (See D.W. Hamlyn, *Metaphysics*, p. 163). There is no word in Greek that explicitly means "consciousness" or no word for "mental" that has a connected connotation, according to Hamlyn. Such was possibly due to doubt and uncertainty of things, sufficient to bring into contrast outer-inner speculations in philosophy. Descartes, however, had no difficulty in being explicit about the conception of the mental or inner state to which we have private and privileged access. Since then, philosophy has pursued the problem vigorously, with, however, attention being seldom given to the theory of emergence, which draws attention to the importance of a natural sequence in the emergence of consciousness through and from matter, even though this doctrine has been before the philosophical world for about three quarters of a century as a study of the history of nature as well as speculative cosmogony.

With reference to the seven stages presented in the diagram, it goes without saying that each level is wholly integrated, in the same way that the various levels are presented by Lloyd Morgan, Oppenheim and Putnam in 1958, and Sam Alexander and others. The distinguishing of stages has to be regarded and accepted, with what Lloyd Morgan and Alexander mutually agreed was one of "natural piety." In general, what has been considered, is the creative advance of nature in time. As Goudge points out (1965), biological evolution has given rise to innumerable new types of living things, together with the complexity of their "internal architecture." Whether there are a series of mutations or a large one such as that which introduced the placental animals at the start of the Tertiary period some fifty million years ago, when the first monkeys and apes appeared, does not detach from the fundamental continuity of emergence. There have been critical thresholds and many inferences necessarily vague, but all in all the doctrine of emergence is a fairly valid description of the history and progress of living things. As far as the emergence of mind is concerned, the indisputable feature is the expansion of the brain, accompanied by increased complexity. Added to this is the fact that, throughout advancement, even to the highly sophisticated stage in man, there is a natural link-up between the physical and the mental even though the pace of change has been erratic at times. In the main, evolution has favoured brain development, with mind emergence sequential.

It/...

It is obvious that the bits and pieces of molecular hardware in the structure of the brain could not have of themselves produced such mental states as consciousness, and it is the unknown factor of synthesis in the third stage, as presented in the diagram, that gives rise to problems. The problem is freely solved by some, pointing out that the brain is not a computer but a "living thing."

Berkeley is quite unhesitant in postulating divine arbitrariness, even declaring that without God the objects of experience would not exist in the first place, eclipsing the real problem which is how or why these things should happen. Berkeley accepts the emergence of mind out of life, of life out of matter and matter out of space-time simply as contingent matters of fact.

In more recent philosophy, there has been further "analytic" approach to the problem, Whitehead, for example, vividly realised and described the resemblances, the fundamental continuity, running all through the world of nature, from its most rudimentary forms in the electron and proton, and to its highest emergence in the mental life of man. The physical universe is after all finite in space, and probably in time, and finding a direct role for God becomes more and more difficult, though it was not so to Berkeley and, incidentally, to Teilhard de Chardin in the present age. Nevertheless, those competent to evaluate natural science, such as Alexander, rather tend to positivism in arguing that natural science provides the only valid form of thought.

As/...

As far as life on this planet is concerned, Young points out (1978, loc. cit. p. 34) "that there is much evidence that all the living things on earth had one common origin," for instance all using the same DNA code and similar amino acids. Natural science can reach down to the origin, but it cannot do the same for the "drive" behind life, beyond evolving self-maintaining systems in the laboratory, "little drops of jelly" as they have been described.

Exploring the highest levels of mental life is surely the task of metaphysics, a discipline that dates back far in the history of philosophy, in fact a title of Aristotle's works about the ancient world, though in Aristotle there is overlap with physics. Aristotle was nevertheless clear that what he meant by metaphysics was knowledge of natural bodies, living things and so on, which, in effect, is not so different from the aim of metaphysics to-day. Aristotle's ontology dealt with essences and in terms of those he did know.

In this study we commenced with an outline of mental capacity as "inhabiting" brain neurons without offering any explanation beyond that mental capacity must have originated somewhere and that the "most likely" origin was in the brain, without attempting to enlarge on what actually constitutes mind. The problem is evaded after outlining mind's emergence in evolution. But with further sophistication of mental capacity one is pressed to enquire what "entity" is associated with periods of awareness. Clearly it has no physical dimension, and is conveniently used as a description of the general mode of operation/...

operation of the brain. Such a vague concept, even more complicated by the fact that as Young says (1978, loc. cit. p. 216) each of us has as it were, two minds "with distinct capacities," on the right and left sides of the brain. For example, a person may be good at mathematics with his left side, but a poor artist on his right. However, fortunately, the whole complicated system is, as Young points out, controlled by one central reticular system and produces in each of us a single stream of consciousness, and from moment to moment a single entity, the self, has to make decisions about the future course of action upon which life depends, such as for example embarking on a highly hazardous rock climb.

Here then, on the authority of Young, we have the assurance that consciousness is a single stream specific to each individual, with the implication that as a single stream of energy it reaches up into the seventh stage (Figure 2). Hamlyn (1984, loc. cit. p. 8) states that his own approach to metaphysics is to say that "it is concerned to set out in the most general and abstract terms what must hold good of conscious beings and the world in which they live if that world is to constitute reality for them." Such a statement should hold good also for any speculation referring to life beyond the energy-stage of the noosphere.

Individuals do have thoughts and feelings of which they may not immediately be aware. That vague term instinct, little

used/...

used by biologists to-day, refers to inherited and not learned behaviour called-up when required, as in self-preservation, suggesting that its origin may be in some primitive area such as the brain-stem, which evolved before the cortex. On the other hand, it has to be appreciated that consciousness, for example, can depend on an elaborate structure in man to-day. Parts of consciousness have been demonstrated as having been lost by damage to parts of the brain, clearly indicating that the source of consciousness is not relegated to any specific part of the brain. Suggestions have been made that it exists in the many millions of brain neurons as a built-in feature in which somatic state consciousness and awareness are natural phenomena partaking in evolution. This is not an unreasonable theory, falling in line as it does with the theory of the emergence of mind in evolution.

It is interesting to note how neurologists have differed in their opinion of the location of consciousness. It will be recalled that Eccles believed it to be at an area in the topmost layer of the cortex, that is the sheet of nerve cells and fibres that occupies the top of the brain, and each neuron in its receptive area, according to Young (1978, loc. cit. p. 290), represents some external feature, and those of its motor areas representing movements of muscles. As stated earlier, Wilder Penfield located consciousness in the brain-stem or old brain, Beritoff, the Russian neurophysiologist, assigned it to interneurons, while Sperry regarded it as a property of the brain circuitary as a whole. Sperry's hypothesis would appear

more/...



more conformable with emergence, since consciousness is a state which the whole brain gives rise to during experiencing and thinking. Sperry definitely claims that consciousness is an emergent (See Taylor 1979, p. 72). Sperry specialised on hemisphere disconnection and in 1966 wrote (See Taylor. p. 126), "The evidence suggests that consciousness runs in parallel in both the hemispheres of the split brain person," which was unwelcome to dualists since it appeared to rule out the existence of a soul. Young has pointed out (1978 loc. cit, p. 216) that further information should allow us to replace the single concept of mind and mental activity, which includes consciousness, by other concepts more fully descriptive of the modes of action of brain processes, even though, as stated earlier, there results a single stream of consciousness, embodying "felt" feelings and feelings which we have to "dig out" by introspection. Ewing states that there is always the sense of "something more" even beyond what we explicitly notice in our introspections (1985, loc. cit. p. 110).

A factor which may be considered as having a bearing on the phenomenon of consciousness is the organisation of brain proteins. Taylor quotes the researches of Lance Whyte (1979, loc. cit. p. 45) whose book "Internal Factors in Evolution" offers the hypothesis that proteins within the mass of neural cytoplasm become oriented in the direction of electron flow and so emit mental activity, which boils down to molecular activity in the brain, and states further that some of the phenomena which at present we find so mysterious could be accounted/...

accounted for by the hitherto not understood ramifications of the orientated proteins. In connection with this, are the rather fanciful theories of some researchers that brain chemicals may even create emotion, which if correct could augur well for treatment of mental illness.

These are interesting speculations, but the fact of the matter is that mental activities continue to defy our understanding, particularly in respect of brain-mind relationship, or as depicted in Figure 2, "the unknown factor of synthesis."

Nevertheless, the capacity to be conscious evolved naturally with brain evolution, which indicates that such capacity evolved gradually as an awakening process within emergent evolution in an incredibly complex brain. It is said that each cubic inch of the cerebral cortex alone carries with it more than ten thousand miles of nerve fibres connecting the cells together, and more than a million nerve fibres run from the eye to the brain, indicating how prodigal nature is. (See Taylor, 1979, loc. cit. p. 41). In addition to these astronomical figures, every neuron is influenced directly by hundreds of thousands of other neurons, and in several different ways.

With this formidable challenge to biologists we are justified in pausing to wonder how close man will ever really get to understanding the mystery of life's processes. So far

there/...

there has been no breakthrough, but research continues, as it will always do when a challenge is presented, and in this respect there are various approaches to the problem, such as that proposed by William James that there are potential "forms" of consciousness, all entirely different, a philosophy which is in line with his pluralism and an attempt to expand on his belief in the immediate experience of the self's activity. Except for his view of the primal stuff as pure experience, James disliked abstract thinking, such as declarings on the unity of the universe, because actually in practice, that is, in direct experience, discontinuity exists. James' functional psychology nevertheless is dynamic, demanding his right to live, right to believe, as for example man's right to believe in God. As regards consciousness, he found no objection to regarding it as a function of the brain.

The implications from James' psychology are that mind and matter were both logical constructions out of primitive elements which were themselves neither mental nor physical, with such elements as images and feelings entering into the constitution of minds, and thus helping to constitute minds.

In the view of the emergence of mind, there can be little doubt that experience of life built up, or evolved, mental capacity, which is really what is implied though, not expressed in terms of the theory of evolution. Similarly, the mind's capacity to reflect on its own states, as in  
consciousness/...

consciousness has gradually been acquired.

Of interest is Teilhards's question, "Is consciousness solely a property of matter, seeing it cannot be localised in the universe?" The problem becomes deeply complex and the best one can say in this respect is that in humans it is the specific effect of "organised complexity," just as evolutionary advance presupposes purpose, and one must agree with Teilhard that there is some sort of psyche in every particle of matter giving rise to infinitesimal psychic centres in the universe. Fortunately for man, the brain has evolved as a monitoring and organising device, the capacity and immensity of which man is not fully aware, or ever brought into the focus of consciousness by the fact of inadequate knowledge.

Philosophical knowledge, also, depends on the division between realists and idealists, absolute and relativistic theories of truth, that is whether what is said is independent of relationship to ourselves or otherwise. The other division assessing our capacity for knowledge is between rationalists and empiricists. In the first case the philosopher may lean too heavily on the security of the natural sciences, which, in the light of further experience, can alter. Empiricists, on the other hand, state that immediate objects we sense are ideas, which severs real things from existence by plunging them into mental states or entities. What we know or see are only known to us by inference. Bertrand Russell rejected such a

philosophy/...

philosophy of private experiences, but at the same time in a rather complicated form of reasoning claimed that mental events are identical with physical states in the brain, but as Ayer states (1982, loc. cit. p. 38), how exactly he came to such a conclusion is not clear.

In epistemology there are so many conflicting opinions about what exists and what happens in the world around us, the difference between having knowledge of something in the world and merely having a fallible opinion, that one cannot be sure such knowledge is believing or even guessing. Knowledge at its peak, according to Urmson (1983), as opposed to guesswork and opinion, is to be found where the sciences at their peak are to be found. What is known to some and is in principle knowable to all, is any body of truths conclusively established by the rigorous methods of true science, because they use "pure thought," not vitiated by the deliveries of the senses. Holders of this view are strictly rationalists and the weakness is that over-rationalism may lead to abstractions, and it seems justifiable that what is required in the quest for knowledge is a "bit of each," both sentience and reason.

Summary of Chapter Two

The foregoing chapter is a philosophic discussion on the occurrence and features of consciousness, presented in the light of its emergence in man, life moving forward in what may be described as a mysterious union with consciousness.

This union brings about, with further evolution of man, a degree of specialisation in the individual, such as self-consciousness and self-awareness.

An emergence of this nature could not have arisen by chance and is accounted for by the age-old metaphysical concept of potential in original matter. This emergence of potential exists within nature's design to enable man to contend and defend his existence in the natural environment. In this respect consciousness is not a chance phenomenon, having been first provided for by the evolution of neural structure in the brain.

In all this process of emergence, man has become aware of his selfness over the long period of evolution from early Australopithecus and with such emergence he has become competent to rationalise and argue on his own destiny and place in the order of life on earth, the whole basis for this ability being accounted for by the evolution of a remarkable creation, the brain.

The net result of the evolution of self-conscious  
ability/...

ability to think and plan refers to a unified and organised functioning of the brain, known as the mind, which is likewise within the plan for man's self-preservation.

References to Chapter Two

- Williams, B.A.O. (1983). Ed. J.O. Urmson. *Western Philosophy and Philosophers*, Hutchinson Group, p. 75.
- Merleau-Ponty M. (1962). *The Phenomenology of Perception*. Routledge and Kegan Paul, London.
- Tobias, P.V. (1965). *S. Afr. Arch. Bulletin*, Vol. 20, p. 179.
- Young, J.Z. (1978). *Programs of the Brain*. Oxford University Press, p. 38.
- Falk, Heinrich (1967). *Can Spirit come from Matter?* *Int. Philosophical Quarterly*, Vol. 7, p. 543 (Translated).
- Taylor, Gordon Rattray (1979). *The Natural History of the Mind*. Secker and Warburg, London, p. 75.
- Eccles, J.C. (1951). *Hypotheses Relating to the Brain-Mind Problem*, *Nature*, 168, p. 53.
- Sherrington, C.S. (1940). *Man on his Nature*, Cambridge.
- Ewing, A.C. (1985). *The Fundamental Questions of Philosophy*. Routledge and Kegan Paul, 3rd Impression.
- Lonergan, Bernard J.F. (1958). *Insight. A Study of Human Understanding*. Phil. Library, New York.
- Russell, Bertrand. (1948). *Human Knowledge, its Scope and Limits*. Allen and Unwin, London.
- Cohen, Sir Henry (1952). *The Status of the Brain in the Concept of Mind*. *Philosophy*, Vol. 27. p.p. 195-209.
- Gouge, T.A. (1976). *Neodarwinism, Mental Evolution, and Mind-Body Problem. Basic Issues in the Philosophy of Science*. Ed. Wm. R. Shea, *Science History*, New York, P. 11.
- Pribram, K.H. (1969). *Some Dimensions of Remembering: Steps toward a Neurophysiological Model of Memory*. In: *Brain and Behaviour*. Ed. by K.H. Pribram. Penguin Books. p. 254.



- Smith, Anthony (1984). *The Mind*. Hodder and Stoughton, p. 116.
- Goudge, T.A. (1967). Teilhard de Chardin, Pierri.  
The Encyclopedia of Philosophy. Ed. Paul Edwards.  
Cromwell, Collier and Macmillan, p. 83.
- Ayer, A.J. (1982). *Philosophy in the Twentieth Century*. Unwin  
Paperbacks, London, p. 177.
- Groch, Judith (1964). *You and your Brain*.  
Cassell, London.
- Goudge, T.A. (1964). *Ethics and Evolution*, Dept. of Philosophy,  
University of Toronto.
- Burnet, John (1928). *Early Greek Philosophy*. Macmillan & Co.,  
p. 145.
- Lieberman, P. (1971). On the Speech of Neanderthal Man.  
Linguistic Inquiry. Vol. 2, p.p. 203-222.
- Goudge, T.A. (1965). Another Look at Emergent Evolutionism.  
Dialogue, Vol. 4, p. 283.
- Urmson, J.O. (Editor) 1983. *Western Philosophy and  
Philosophers*. Hutchinson Group (S.A.)  
Johannesburg, p. 93.

CHAPTER THREE

DISCUSSION TOWARDS THE INTERPRETATION OF

MENTAL CAPACITY

The emergence of mental capacity is a theory associated with long term trends in the evolution of the human species, but these may often be very difficult to substantiate. Julian Huxley states (1974), "The primary evidence comes from continuous fossil series, but incomplete or even fragmentary series may often be satisfactorily completed by the use of indirect evidence from comparative anatomy and embryology, and the indirect evidence may supplement the direct by showing us, to a considerable degree of probability, with what physiology and what behaviour to cloak the fossil bones." Sir Julian goes on to point out that the considerable majority of trends are definitely adaptive, justifying the well-known fact that large systematic groups usually contain representatives adapted to a number of mutually exclusive ways of life.

There is also the problem of parallelism in mammalian evolution on the assumption that in each group numerous separate lines of descent run parallel far back into geological time, before divergence from a common ancestor can be postulated, each group radiating out (adaptive radiation) to take possession of different environments and so to develop differently and at different rates. An example, probably in Pre-Tertiary times at the end of the Cretaceous, is when seals and sea-lions branched off from carnivore stock and became aquatic except for  
reproduction/...

reproduction.

Sometime during the Pliocene, about ten or so million years ago, *Australopithecus* began to split into *Australopithecus bosei* and later subdivided again into two species, as shown by Tobias (1965), while the main stem proceeded through the Pliocene to consolidate as *Homo habilis*, having earlier taken a chance to consolidate on the ground as hominids during the end of the Miocene. There were stamped on him then, and continued right through to modern man, indelible features such as molar crowns. So it was during the later Miocene and early Pliocene that great anthropoid apes came out of the security of their forest habitat (1937).

The above very brief sketch is a reminder of how man has arisen in evolution and become the sophisticated creature he is to-day. Of course, as Julian Huxley emphasises (1974, loc. cit. p. 586), "Man is unique in having markedly reduced the impact of natural selection on the survival of individuals by artificial means, such as medical care and sanitation. The relative importance of differential survival and differential reproduction has thus been completely reversed in most present-day communities. The human situation is so different from the biological that it may prove best to abandon the attempt to apply concepts like natural selection to modern human affairs."

This psychosocial transformation is important, as many may wonder in view of the history of living things, what is going on since the inception of the cultural period, which is  
said/...

said by some to date back some three hundred thousand years but has been gaining momentum over the past nine thousand years or more, and in fact is now proceeding at an alarming rate.

Through all the long period of primitive life, brain evolution was still continuing, as though in preparation for a time when, as Sir Henry Cohen puts it, there could be a more efficient process of "liaison with mind" (1952).

Palaeontologists and biologists alike, stress such emerged liaison, however, was gradual, dating back to its beginnings early in the hominid line when certain connective nerve tissues in the brain began to evolve.

Even though in recent times, natural selection is not conspicuous, there can nevertheless be, according to Julian Huxley (1974, loc. cit. p. 588), change in gene-frequency which may occur by chance, through random survival without the intervention of selection. Biological research is highly complex and the pressure of selection very much concealed, so much so that man is not fully aware of its evolutionary force in this psychosocial phase, the latter a term probably preferable to "cultural" phase, although evolution in the psychosocial phase is mainly cultural, manifested in cultural change, and only secondarily genetic.

Darwin believed that his theory of evolution provided in natural selection for a preservation of whatever benefits the  
community/...

community contributes to the greatest happiness of the group, though he made no deliberate effort to reconcile natural selection with humanitarian ideas, as indeed Spencer did not either, though Darwin did believe that the general happiness does involve a "bitter struggle." Goudge states (1964) that it remained for T.H. Huxley to "exhibit in a dramatic way the conflict between Darwinism and decency in modern society," and this is achieved by the individual repudiating the gladiatorial theory of existence, the ethical process not imitating the cosmic process, still less in running away from it and denying it, but in combating it by the conviction that the cosmic process has no sort of relation to moral ends.

Such a philosophy as the above seems to forget the difference between human evolution and pre-human evolution. The same causal factors, in the first place, were not at work in both periods, man's elaborate social traditions and practices of the last fifty thousand years, transmitted through spoken and written language, his tremendous ecological evolution, enabling him, according to Ernst Mayr (1963), to be capable of "transmitting non-genetic components of culture."

This may be wishful thinking. Does nature indeed permit any "new type" evolution? The whole process could in fact be degenerative and inevitably lead to man's extinction through a form of self-propelled progress ignoring the age-old elements from which we have emerged and cannot biologically eliminate. Nature ruthlessly goes on its own way, merely ensuring as best as possible survival of a species. Julian Huxley states quite emphatically/...

emphatically that no form of evolution does more than that, and it is not a natural law to ensure progress or maximum advantage "or any other ideal state of affairs." (loc. cit. p. 466). Natural selection brings types into existence, but in the grand economy of nature it is also destructive, otherwise all the well-known forms of life would go on existing. One might add that if man observed natural development instead of going against it by overreaching himself in the spirit of hubris, things might work out differently.

Young states (1978) that there is a complicated and very little understood relationship between organisms and their past history and present environment. Nature does not place all her cards on the table and for man to believe that he can "take over" the direction of evolution may be presumptuous and unpredictable. All psychosocial selection can do, involves some sort of selection between competing ideas and values, and according to Julian Huxley (1974, loc. cit. p. 613) "is clearly very different from natural selection." Huxley also, incidentally, draws attention to the fact that Teilhard indicates trends for "future progress" in the existing psychosocial period. In fact a significant question that Teilhard does ask, according to his biographer (1965), is if purpose is not in matter, how comes it to be present in man? Because "some sort of psyche," which Teilhard sees in every particle of matter, may not be inaccessible to the highest reaches of man's mental development and, as thought, may so be organised to bring about his eventual salvation.

In order to achieve what Julian Huxley terms a "unified  
biological/...

biological outlook," more than a classification and analysis of evolutionary trends is required. Biologists and neurologists alike find it imperative to explore the inner workings of living units in the hope that a better knowledge results. Such investigations are directed towards the effect of drugs and chemical agencies on the body and also the structure and functioning of the body's "machinery." For example, the study of the effects of genes during development is known to be as essential for an understanding of evolution as is the study of mutation and selection. It stands to reason that evolutionary progress, as consisting in a raising of the upper level of biological efficiency, raises the challenge to research into how that efficiency is evolved and maintained. Of interest, in passing, is Julian Huxley's quotation of J.B.S. Haldane's use of the word "progress" in evolution (1974, loc. cit. p. 565), where the latter writes, "I have been using such words as progress, advance and degeneration, as I think one must in such a discussion, but I am well aware that such terminology represents rather a tendency of man to pat himself on the back than any clear scientific thinking ..... Man of to-day is probably an extremely primitive and imperfect type of rational being. He is a worse animal than the monkey ..... We must remember that when we speak of progress in evolution we are already leaving the relatively firm ground of scientific objectivity for the shifting morass of human values." Wise words maybe, but nevertheless it has to be born in mind that man is the latest dominant type to be evolved, and furthermore values must surely

be/...

be regarded as essential criteria for future progress and have only gained some meaning since the beginning of the psychosocial state. Few would refer such mental attributes to man half a million years ago, even though he were as much involved in evolutionary progress as at any time in the long history of evolution.

Julian Huxley states (1974, loc. cit. 572) that "in the past, every major step in evolutionary progress has been followed by an outburst of change ..... Conscious and conceptual thought is the latest step in life's progress. It is in the perspective of evolution, a very recent one, having been taken perhaps only one or two and certainly less than ten million years ago. Although already it has been the cause of many and radical changes, its main effects are indubitably still to come."

Julian Huxley is of the opinion that any genetic changes in the biologically near future must be sought in the improvement of the fundamental basis of human dominance - the feeling, thinking brain, and the most important aspect of such advance will be increased intelligence, implying greater disinterestedness and fuller control of emotional impulse, which fundamentally implies genetic changes.

Can man achieve such change through his own initiative at this stage of knowledge by such revolutionary research as  
that/...



that suggested by Haldane in his work, *Daedalus*, (see Julian Huxley, loc. cit. p. 573) as to reproduce our species solely from selected germinal tissue-cultures? It would seem that of prime importance would be to genetically raise the brain's level of performance in acuteness of perception, memory, synthetic grasp and intuition, analytic capacity, mental energy, creative power, balance, and judgement.

Julian Huxley refers to the possibility of further development of telepathy and other extra-sensory activities of mind. Higher ranges of aesthetic creation or appreciation or pure intellectual construction, increasingly characterise man's cultural advance and play a large part in human existence and of course are of value in themselves.

Great steps have been taken in evolution over millions of years, such as the move from water to land of vertebrates and the homothermy of mammals demanding the scrapping of scales for hair, but more radical than any other has been the step to conscious thought with the introduction of morality, pure intellect, aesthetics and creative activity; and added to that, the mental ability to consciously formulate values, not solely visionary but to control and advance biological progress as well.

In emergent evolution one has to look backwards as well as forwards in order to establish firm ground. After all  
evolutionary/...

evolutionary theory substantiates a recognition of the emergence of subjectivity or "inwardness," maintaining even that it has roots in the most elementary things, thus rounding-off into the cultural period the entire process in a long and inspiring advance, and most important of all, not without purpose, though to some degree, "opportunistic." Such a biologically based philosophy does after all embrace the existentialist's concept of freedom, freedom through emergence of mental capacity to embrace it, all because nature has provided man with such mental capacity. Nothingness existed before organic life on earth, and emergent evolution has brought content and meaning into existence and is still doing so. Jonas (1966) in his book on the defence of an amalgamation of emergent evolution and some categories of existentialism, states "there is no organism without teleology and there is no teleology without inwardness," though at times such claims could be construed as rather mystical.

As observed earlier, man's advancing mental capacity is keenly being explored by biologists and neurophysiologists. There is, for example, Sherrington's classic research, stressing the importance of the brain in transforming electrical charges from the sensory organs into the reality of a thing. In the case of the eye, it is not the optic nerves, but the brain that sees, with instant and decisive efficiency. It is that cell-labyrinth, a veritable and almost infinite number of criss-cross cells, that interests the neurophysicist, the not understood/...

understood mechanism in which these cells handle generated nerve currents running to the brain (1955).

Cohen (1952) is confident that "sooner or later electrical charges will be found associated with acts of so-called "volition; and in general, it cannot, on physical grounds, be regarded as impossible that with sufficient knowledge a complete explanation of the electrical activities of the brain might reveal what a person is thinking and, indeed, might foretell his actions." But the enigma still remains as to how physical brain and psyche interact.

Russell Brain (1950) hazarded a guess that the power of the brain to "abstract," is both physical and mental. "The word "dog" may be uttered in different ways, seeing or spoken with differing pitch or intensity, yet it has a pattern which can be "abstracted" in the same way that triangularity can be abstracted. An appropriate stimulus might recall a pattern otherwise lost."

Eccles (1951) suggests that the brain or cortex exhibits a special property during consciousness, entering into liaison with the mind, having the property of a "detector" that has a sensitivity of a different kind from that of any physical instrument. Mind achieves its liaison with the brain by exerting spatio-temporal "fields of influence" that become effective through this unique detector function of the active cerebral cortex. An example of this hypothesis is the continuance of

mind/...

mind when large portions of the brain are destroyed. In other words, Eccles, in exploring the physico-chemical nature of the organism, has found something which is not physico-chemical, namely, mind or psyche.

It seems that many of the characteristics attributed to the abstraction "mind", must now be conceded as belonging to the abstraction "brain", which fact emphasises that there is still a serious lack of understanding in neurophysiology, in fact ignorance, of what mind really is, and quite definitely it is something very different from any chemical or electrical actions associated with it. It appears that mind must go on being an independent reality for a long time, perhaps for ever, and that what we come to interpret about the phenomenon is speculation, bridging the gap between electro-chemical activity and so-called output, possibly being, after all, a concept without any foundation in reality. No one in the first place can be sure, as Young states (1978, loc. cit. p. 271), that reference to concepts of brain and mind is the answer, and that it is not impossible that the ghost is part of the machine after all!

As referred to earlier, Eccles prefers the term conscious mind, that is a thinking mind, and as such is a fact of experience, albeit a fact of individual experience, private and restricted in nature. But by communication they become public and a part of the raw material upon which scientific investigation may properly operate.

A/...

A neurophysiologist, according to Eccles (1951, loc. cit. p. 56), would consider the synaptic knob (Figure 3) as the key structure on which 'mind influence' might work, there being a mechanism in the active cortex that could effectively amplify by thousands of times, minute effects exerted on the individual synaptic knobs. When it is considered that one square mm of neural tissue covers about fifty thousand neurons, the immense complexity of neurological brain can be well imagined by those who endeavour to explore it.

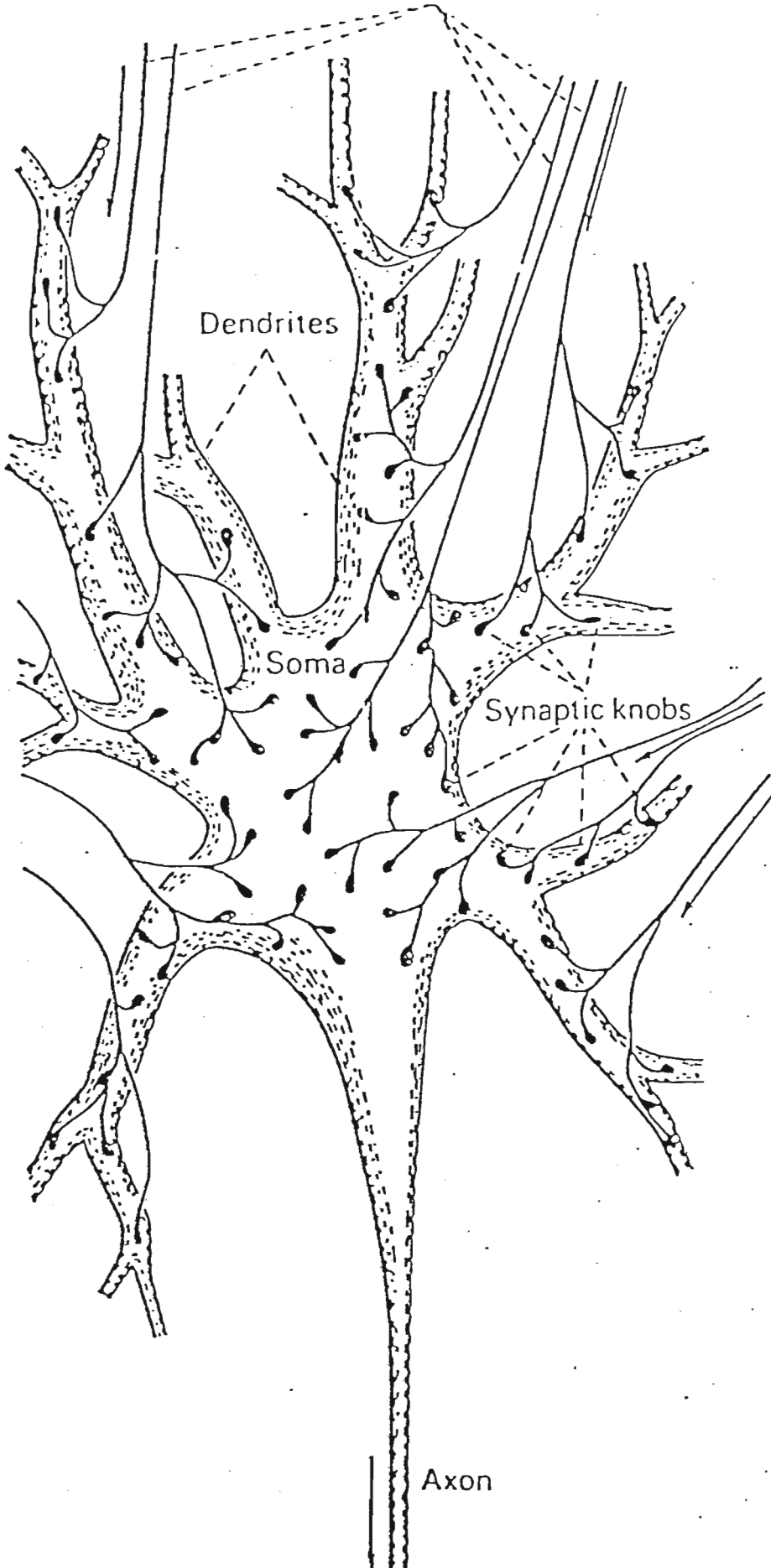
Taylor states (1979) that Sperry is definite that mind can effect the brain as well as the reverse. The big question, however, still remains and that is, how this activity comes about in the ten thousand million-fold detectors that exist in the cortex during consciousness.

In studying the brain many experiments are performed with chemicals. Science has shown that, though the brain is regarded primarily as an electrical switching device, there has come in recent years the realisation that it is also a complex chemical system and it is quite recently that neurochemistry has risen to prominence.

Borek in fact has gone as far as to state (1961) that, "Every living creature is a chemical conglomerate existing in a vast sea of chemicals." In fact it was not until the

middle/...

-105-  
Figure 3  
Afferent  
nerve fibres



*The main body of the neurone receives hundreds – in some cases thousands – of inputs from other neurones; some of them encourage it to respond, others discourage it. Thus every neurone continuously takes decisions.*

middle of the nineteenth century when Friedrich Wöhler had synthesised urea twenty-two years earlier, that the importance of chemicals in the life process of organisms really became known. Following on from this was the chemical study of the unit of structure of life, the living cell.

There are countless instances of the effect of chemicals on brain activity and resultant mind. A well known fact is the disturbance of mental activity accompanying vitamin deficiency, such as that resulting in pellagra, characterised by eruptions on the skin followed by disorders of the digestive and nervous systems. These symptoms are reported to disappear in pellagrins when nicotinic acid, (where absence is responsible for the disease), is administered. Furthermore, an artificially produced deficiency of biotin converts normal humans into cases requiring psychoanalytical treatment. Likewise the source of energy for the brain is the metabolism of sugars, while deranged enzyme systems in the brain result in temporarily deranged personalities. Borek also quotes the case of where one millionth of a grain of lysergic acid drug induce "transient hallucinations mimicking a psychotic state" in a human. There is strong evidence that schizophrenics have definite biochemical aberrations from the normal.

To-day it is realised how important chemicals are in giving rise to "thinking." For example, how are messages sent across the gap which exists between the muscle and the end of the nerve fibre, in which there is no direct contact whatsoever  
between/...

between the two types of cell? It has been shown that the answer is the injection of some potent chemical, such as adrenalin, into the space.

Young (1978, loc. cit. p 66) quotes the case of neurons in the brain of a sea-hare producing a peptide whose injection into another animal induces egg-laying, which results from the setting up of signals by the nervous system to instruct that breeding should occur.

Many examples can be quoted of how animals are vital agents in the propagation of nerve impulses. Sodium and potassium chlorides have an important role in neuronal activity, as their ions are carriers of electric charges. In all this, there is a resulting difference of electric potential inside and outside the cell. This, according to Gerardin (1968), can be summarised by saying that the neuron is polarised with respect to the external environment, with a potential difference of seventy millivolts between the two sides of the cell, the inside being negative, hence the significance of Borek's observation of a "vast sea of chemicals." Perception itself is an electro-chemical process, busy in the unconscious centres of the body.

Human memory is still an unknown factor, but there is some evidence that it is distributed throughout the nervous system, and is a "hastened depolarisation system," and is thought to reside in the very large molecules of nucleic acid

and/...



and is conditioned there by simple chemical processes. In this way it seems almost certain, incoming information is stored as memory produced in the cells themselves. It has even been thought that short-time memory is located in certain much branched and fibrous cells called neuroglia, which unlike neurons, are constantly renewing themselves.

All living creatures have a common origin at the molecular level, largely because amino acids and other organic molecules could be formed with ease on the primitive earth and that in the space of a billion years, molecular evolution shaped an organism capable of housing the mysterious quality of life. "If a definition has to exclude as well as to include," says Sherrington (1955, loc. cit. p. 85), "it must lean on a logical boundary of what it defines; the term of life has no such boundary from lifeless," and Albert Szent-Györgyi says (1960), "We will really approach the understanding of life, when all structures and functions, all levels, from the electronic to the supramolecular, will merge into one single unit."

Where in the material background, which is remarked upon in the foregoing pages, do we find room for the emergence of mind? Once again we turn to Sherrington (1955, loc. cit. p. 107), with his wisdom and deep philosophical insight, "Suppose tentatively, at pause before the riddle," he says, "we allow the promise that in the developing embryo there resides some form of mind or psyche, and even in each of its constituent cells/...

cells, and not inferior to what as human individual it will ever have. Mind so present and intent on producing the child to be, would still be faced at every step with "how." It would be helpless. It is an aggregate of cells doing what they are doing for the first time and the only time they ever will. Yet every step they take seems fraught with purpose towards a particular end. The purpose clear, the "how" of it obscure. Watching the limb-bud enlarge and shape without hitch to an arm, the surprise is not when all goes right but when something goes wrong. Perhaps it is best to think of it as an inherited final cause."

The question whether matter can promote itself and so ultimately give rise to the emergence of mind, has been considered by philosophers. But what of the original cause? Ewing writes (1985), "Many thinkers have called the qualities of mind and life emergent properties, by which they meant that they emerge from but are not explained by what went before. This is certainly so at the level of human knowledge, but if it is merely meant that the causation of these qualities is unintelligible to us, this is the case not only as regards them but as regards all instances of causation in the physical world. The assertion of the "emergence theory" must be viewed as mainly a denial of the principle that a new kind of quality cannot come into being, but those expositions of the theory I have read have usually left it obscure whether the emergence of the new  
qualities/...

qualities was supposed to have causes but causes which did not render them intelligible or whether it was supposed not to be caused at all."

Emergence certainly does raise problems and one has to confess that such a theory leaves much unsaid. In the meantime let us hold out for what Polanyi calls "The vision of reality beyond the impressions of the senses" (1958).

It is believed in discussing emergence one has to cast back into evolutionary history, for in such history there may be the likelihood of tracing cause, certainly greater likelihood than pure speculation. For example, man's relation to the environment since early hominid times, could well be indicative of many features of emergence, certainly in physical development. Young (1971), has referred to developments in physical changes in man since the middle of the Pleistocene, such as alterations in glands, brains and no doubt reproductive functions. In particular there is the emergence of "culture," promoted by increased co-operation especially in evidence in the change from Palaeolithic hunting to Neolithic habits and later to some form of land usage. The establishment of home bases is also a sign of reasoned behaviour, as was the need for attending to others. Increasingly early man had to look to it that, in order to survive, he had to evolve new habits of living, and with these changes came changes in mental capacity and brain volume. In

this/...

this respect "the single line of descent" succeeded with other related lines fading out, *Homo habilis* being modern man's authentic distant relatives. "Bone for bone, muscle for muscle, organ for organ, every ape feature is repeated in the human body," says Romer (1968). "The differences are mainly in proportions and relationships of the structures concerned; differences related mainly to methods of locomotion and brain growth and, as lesser features, the shortening of the face, reduction of canine teeth and, in modern man, development of a chin."

In the evolutionary stages of man, body and mind developed fairly parallel with each other up to the later period of *H. erectus*. Thereafter, mind emergence accelerated, though neural connectivity lagged, and it was not until the psychosocial stage that mental capacity advanced at its astonishing rate. Speech had a particularly important role in initiating brain and mind development, some authorities claiming that this process commenced as far back as *Homo erectus*, about a million years ago (Young, 1978, loc. cit. p. 186). Moreover since it is now shown that part of the basis of human speech is inherited in the DNA, there must have been evolution of it going back a very long way. At all events, speech, or language, has played a very important part in the emergence of mind, some say up to seventy per cent. Eccles states (1976), that "a human child growing up in social isolation will fail to attain a full consciousness/...

consciousness of self." (See under J.O. Urmson, 1976, p. 111).

Brain is considered by some more difficult to fathom than the concept of mind, states Young, referring to "our current ignorance about brains" (1978, loc. cit. p.3). We can, however, gain some insight about both brain and mind by reference to the theory of emergence which has reference to their origin.

Palaeontology has been extremely useful in this respect and any rejection of its findings would certainly impoverish discussion, even, as Young states, of the most abstract problems. Biologists to-day must feel that literature on the "human situation" lacks concrete calculations unless backed by evolutionary theory. The growth of our knowledge of evolution, slowly accumulating since about 1880, and the facts presented, such as Haeckel's observation that all creatures recapitulate their evolutionary history, have surely, in the words of Blake, "cleansed the doors of our perception."

Urmson (1976) defines a philosopher also as a naturalist "if he considers that the totality of things which we call "nature" and which are studied in the natural sciences, is the totality of all things whatever, and if he denies the need of any explanations of the natural in terms of the supernatural; such a philosopher will normally hold that any reference to a deity or to a realm of values, or to mind, thought of as something more than a natural phenomenon, is illegitimate.

With/...

With regard to such nineteenth century thinkers as T.H. Huxley, naturalism especially connoted a belief that life and thought could be completely explained, in principle as arising by evolution from matter."

The study of the methods of natural science, together with philosophical analysis by reflection, seems to be a sensible approach in analysing the human situation, provided such analysis is rational. A rational analysis would base its judgements on a knowledge of evolutionary history. As an example of this, consider the known roles of the cortex and the mid-brain, or the new and old brain, which in some respects conflict. The cortex or "cold" brain, as it is sometimes called, has its arousal system in the mid-brain, or "hot" brain, which latter as Taylor reports (1979, loc. cit. p. 28), is impulsive, wilful, wants everything now, while the cortex looks ahead and evaluates the results. The mid-brain tries to impose its pattern on the external world, the cortex imposing external organisation on the internal world, and Arthur Koestler has argued, as also quoted by Taylor, that man's troubles arise from the enormous development of the cortex, the pursuit of intellectually imposed aims at the expense of more down-to-earth thinking. At the same time the latter course carries with it some primitive tendencies, such as lust for power.

Whether one agrees or not with such differentiation, the  
theory/...

theory arises through scientific study of the "facts" of evolution, that the human brain, in addition to evolving to a greater volume over long ages, has to-day left man with a possible two-level brain, not only in structural terms, but mental as well. Science is attempting to look into how the total brain power splits up its complex task.

The point from all this is that the course of man's thinking, his personality, his philosophy, is conditioned by the interplay of neural transmissions from different sites of the whole brain. It is in fact not a case of man having a brain, but of having brains, with the possibility of direct effects on the quality of mind.

One often hears the expression that a person is a "complex character," and it is possible that the study of brain evolution will clarify some of the causes, such as the integrated action of neural pathways between regions.

Neuroscience is a very practical discipline and is dedicated to an analysis of brain-mind structure as evolved and a possible more rational and realistic perspective from which philosophy could stand to benefit.

Young (1978, loc. cit. p. 299) defines thinking as "the perceptual and logical programs (i.e. sets of code signs in the brain) to answer questions about information coming from the sense/...

sense organs, or from internal sources," the last phrase being the important part of this definition. This definition bears weight, since Young sets out to demonstrate that the whole range of human capacities and activities, such as problems of body and mind, associated with believing and knowing, are stored in the brain. Without brain there is no thought." (p. 193).

Unfortunately, neuroscience has not yet any valid concept of efficiency and direction of brain function or intelligence in man, so it cannot be measured. In the process of growth from infancy, the human stores all methods, verbal and otherwise, that have been learned by virtue of inheritance of human capabilities and the environment in which he has been reared, to build up a "library" stored in the physical brain. Young further states that man cannot say how the brain operates to make comparisons possible and hence becomes capable of both induction and deduction.

Creation of more neurons in the brain and later more efficient connectivity during psychosocial evolution, has measured the advance of what Young calls the dictionary of grammar of the brain, from early hominids to modern man. The brain's entire highly complicated inner activity is continually in contact during consciousness with the outside world, coding, analysing and reflecting on the impulses coming in through apperception of the environment. The ten thousand million nerve cells in the human cerebral cortex (and each one is different) individually/...



individually correspond to one of the following (1978, loc. cit. p. 44):

a small part of one particular feature of change going on in the outside world,  
some small part of a memory record of a past external change, or  
to some small part of the instructions for an action that can be done by the body, say to initiate the movement of a few fibres of one muscle.

This goes on from moment to moment and depends on the power of the nerve cells to produce certain electrical and chemical changes, transmitting signals known as nerve impulses or action potentials. Superimposed on such intricate brain activity are what Julian Huxley (1974, loc. cit. p. 42) describes as "long-continued trends," and it is in the imposition of such trends that one recalls the possibility of purpose or adaptive processes directed towards an end, and are part of evolution, which varies from group to group of animals and for which no single formula is universally applicable. Nevertheless science is methodically studying the complexity of the brain, and every fundamental advance in science, as A.E. Taylor says (1930), calls for a "restatement and reconsideration of the old metaphysical problems in the light of the new discovery."

Ewing/...

Ewing (1985, loc. cit. p. 225) remarks on the miracle of the brain with the words that the adaptation of living bodies of organisms to their ends and to the ends of their species, is certainly very wonderful. There are, he states, "thousands of millions of cells in our brain knit together in a system which works. Twenty or thirty different muscles are involved even in such a simple act as a sneeze. Directly a wound is inflicted or germs enter the animal's body, all sorts of protective mechanisms are set up, and different cells are so cunningly arranged that, if we cut off the tail of one of the lower animals, a new one is grown, and the very same cells can develop according to what is needed into a tail or into a leg. Such intricate arrangements seem to require an intelligent purposing mind to explain them."

Goudge (1976) has stated that evolutionary ideas had very little impact on how the human mind is to be regarded until recent years. The facts of adaptability of species is well known, such as the giraffe's development of a long neck to get at the type of foliage required to survive, but what of mental capacity? What explanations are there for the theory of its emergence? Roger Sperry has said that "Mind is an emergent property of cerebral excitation," and he is definite that mind can affect the brain as well as the reverse, a sort of emergent interactionism (Taylor 1979, loc. cit. p. 300).

As an information system, the mind depends on energy expended by brain neurons, and the emergence of mind is a case of derivation

from/...

from a lower to a higher form. It is known, for example, that every cell in the human body, and not only in the brain, contains thousands of discreet hereditary units or genes, a gene being defined as the unit factor of Mendelian inheritance but which can change by mutation. What happens in the cell, as Romer outlines (1968), is that in each cell there is a long spiral thread-like molecule of a complex compound, namely DNA in the chromosome, which constitutes "the essence of life itself."

What happens in the cell not only controls life's development, but factors of inheritance, and is thus a controlling unit, and has much influence upon intelligence and personal thinking, if we accept Bartlett's definition of thinking as "a high-level form of skilled behaviour requiring sign and symbols for its expression yet still possessing many of the characteristics of the earlier established bodily skills which it may have developed and which it has supplemented" (1964).

From the above, the theory could be that both mind and matter have a common origin and that the improvement in organisation of the latter (as in the brain) is paralleled by the improvement in mental capacity, which is the theory of emergence of mind as evidenced by evolution.

Defining conditions for being mental, present a formidable problem, let alone seeking a definition of mind as such. One has only to glance at historical concepts, Aristotle, for example, unifying mind with God, while Broad regards it as a phenomenon/...

phenomenon that provides thought with a certain specific reference. Bertrand Russell claims that experience is the basis of both body and mind, while Spinoza regards thought and physical extension as modes of a single substance. The persistent problem of body-mind relationship is solved by Descartes by stating that thought and physical extension are modes of a single substance. Berkeley of course states that matter does not exist and ideas are only in the mind, actually an ingenious attempt, which proved unstable, to unify metaphysics and common sense (1983).

Ewing states (1985, loc. cit. p. 74) that physical objects, if they are known to us, must be related to mind, and that we therefore cannot tell what they would be like apart from mind, since we cannot know them without ipso facto relating them to mind. The oak tree in the garden stays as an impression or form in my mind, even though it was burnt down last year and all its constituent parts transformed into dispersed chemicals. But form can be retained when matter undergoes change such as the fact that in seven years time, my body will have undergone a complete chemical replacement, though not the form, apart from growth. The atom is reduced to electrons, which possibly is no more than a useful mental picture to symbolize certain mathematical relations and so we cannot properly deny the relativity of the conception of a single substance.

Associated with the problem of mind's relation to the body, there is a long history of philosophical opinion, many serious/...

serious difficulties being attached to the conception of causality between the mental and the physical worlds. Such difficulties gave rise to Occasionalism and led to certain doctrines of Leibniz, for example pre-established harmony. Generally, and for the purposes of psychology, a simple parallelism was assumed, ultimate and deeper explanations tending to assume either a materialistic form (e.g. epiphenomenology, the theory that mental or spiritual entities are not realities in their own right but merely by-products of matter which perish when the material base is destroyed), or again, for example, Spinoza's doctrine that mind and body are parallel manifestations of a single Infinite Substance. Neither is cause of the other, nor is either of them an effect in the ordinary sense of the word, but simply parallel attributes of a single substance. Nor in this historical retrospect must one forget the impact of the theory of Occasionalism, as above referred to. This theory sought to explain in a less difficult way problems of causation by assuming Divine interference which adjusted the relations between two things which appeared to act on each other, but really did not, in respect particularly of body and mind where God continually exerted his influence. In other words, the correlation between the run of events in the one substance and the run of events in the other was explained by the intervention of God. Such a doctrine depends on the straightforward argument that doing something involves knowing

how/...

how to do it, material bodies knowing nothing cannot act, their apparent action upon each other is an act of God. Mind provides the occasion for a Divine act in the other substance, body.

For Descartes, a human being was the point of union of material substance and immaterial substance and it is interesting to note that his followers finding difficulty with attempting to explain Descartes' conception that these disparate substances, body and mind, could act upon each other, called in the solution of God's intervention.

In modern times, the complex problems involved in examining the relations between body and mind were thoroughly explored by Broad (1925). Broad had a training in physics, and regarded British Idealism as "not for him." Consequently he first set out to gain a thorough background in critical philosophy in order to analyse and define concepts such as person, matter, perception and then to criticise the fundamental propositions which contain them, thus dispensing with vague and instinctive beliefs. As a result, he produced no less than seventeen different theories of the relation between mind and matter, the one most favoured being "emergent materialism." In such a philosophy, the characteristic of mentality belongs only to events which also possess an elaborate conjunction of material characteristics.

The viewpoint of saying that the factor of mentality is

emergent/...

emergent is that its presence is not deducible from the constitution and conduct of the material factors considered independently of one another, or in combination with different characteristics, or as Ayer says (1982, loc. cit. p. 176), is not incompatible with holding that the mental characteristics of the events which possess them are causally dependent upon the mental characteristics which these events also possess, when their material characteristics are combined as they are. This concedes that only a particular organisation of matter is sufficient to produce mentality. Furthermore, if we also hold that nothing has only mental characteristics, we shall not be committed to holding that this particular organisation is also necessary for mentality to emerge, at whatever level is in question, for some other form of material organisation might be sufficient as well.

The laws of physics and chemistry will never adequately explain life, as Bergson has reasoned, and it would appear that some divine vital force is present and this is only grasped by man's intuition. It would seem that the force even directs evolution, though as Bergson confesses, it is not possible to explain how and why the movement of evolution occurs. Nevertheless, his great work "Creative Evolution" is prophetic, because without being mystical, metaphysics turns again and again to the possibility that matter is represented by an underlying force or tendency in nature. No scientific explanation is forthcoming and many biologists deplore this.

Julian/...

Julian Huxley himself states (1974 loc. cit. p. 458) that Bergson's life force served as "a symbolic description of the thrust of life during its evolution, but not as a scientific explanation."

In this study, we should really be writing about mental capacity rather than mind, since the former is a phenomenon reserved for a process of evolution, whereas the latter is a controversial term. For example, Aristotle spoke of the vegetable and animal soul, which were stages in life, later surpassed by human consciousness of itself derived through sharing, as much as the animal is permitted to do, the Universal or Divine Mind. Specifically in later times mind referred on the one hand to products of thought, such as political, moral institutions, customs, laws et cetera, and on the other and more permanent side to the universal principle which creates and sustains the world. Another concept of mind is that which is in body, which is psychological and it seems to be the case this definition, limiting as it is, is the one most commonly referred to by philosophers in discussing the mind-body problem, and is actually a concept without sufficient foundation in reality, except in those instances which regard the "I" as not connected with the body in any "physiological" way, that is, not primordial to the body.

The other concept of mind, which we would like to term the evolutionary concept, is that mental capacity emerged  
initially/...



initially and referred to such "products" as those associated with living in the natural environment as a thinking being. Such a thinking being need never have existed, for example my father might well never have met my mother. But, and this is the important point, that thinking being made possible by the neurological background (brain) built into him by the process of evolution, also evolved the capacity for its "thinking faculty" to cover the whole of man's inner personal nature in addition to the intellectual side. And this latter capacity is caused by unconscious feelings and needs of something more beyond, and that unconscious desire is associated with a stage which is introspectively observed, but which cannot be directly observed. In actuality, Ewing refers to this latter in the following words (1985, loc. cit. p. 111) : "All we can say is that it is very surprising that so important an element in experience as these desires should often be inaccessible to introspection."

Evolved mental capacity leads to self-identity as preserved in time and a thought implies a thinker distinct from any thought, but that does not make the thoughts any more than a series of events. On the other hand, the important point, as Ewing states, is that we certainly do seem to have some experience of the "I" which we do not have of anything else, "but it is extraordinarily difficult to be clear what we are immediately aware of when we have the experience" (loc. cit. p. 113).

The/...

The dilemma is often resolved by proclaiming a pure Ego as distinct from its experiences, and yet giving it content by ascribing to it the dispositional properties in question, would be rather hypothetical, because experiences are the only actual qualities we can ascribe to a mind. The argument becomes complex when we ask "need a mind to exist have experiences?" But if we think of it as something apart from its experiences, we come to the notion of a substance over and above its qualities, and this projects us immediately into the greatest problem facing mind-body relationship.

There is also the problem that different people think differently, but such a hurdle can be cleared by the fact that the metaphysical value of deeper issues involves unity between different selves. In this respect mind can be studied historically as a whole. The incompatibility of other minds is associated with conscious mental processes and need not in a metaphysical sense be regarded as incompatible.

Each of us has direct access to our own states of mind in a way that we do not to the physical, that is, privileged access, which gives rise to the belief that the mental constitutes, in some form, the only reality, a belief which Berkeley must have held when he denied any reality beyond ideas, a philosophy which to-day possesses a certain incoherence, according to Hamlyn, in any case (1984).

It might be mentioned in connection with dualism, that

many/...

many people adopt a common sense acceptance of mind and body, believing intuitively in mental reality as a state, and similarly body as a state, the latter because they realise that bodily sensations are normally locatable in some part of the body and for that reason are more intimately concerned with body than thoughts, even if such sensations depend upon the brain, and even though such sensations do have quite a lot in common with the mental. The main feature being that such separate items are by no means identical. This is substantiated by the fact that certain things are mentally private, as only one person can perceive them. Mental states are, or can be, strictly personal, such as having a pain. At the same time it has to be realised that while there can be some doubt about a mental state being private, it is not necessarily an independent sufficient condition to make a definite and final decision about what is mental and what is not, or not without a degree of circularity. There is also the theory that pain is a feedback between cortex and mid-brain, and furthermore that this is a necessary condition for pain to be experienced as distinct from being known about. (Taylor, loc. cit. p. 126).

According to most ordinary empirical criteria which are widely accepted, bodily processes are causally related to mental and vice versa, and therefore, according to Ewing (loc. cit. p. 127), it seems reasonable to accept this evidence (unless there is a strong argument against it), and such would lend strength to interaction. In this connection, Eccles states that for every mental event there is a unique brain-state. He also  
observes/...

observes, "Many men of science, (which includes Eddington, Sherrington and Adrian) find in dualism and interaction the most acceptable initial postulates in a scientific approach to the problem of mind and brain" (1951, loc. cit. p. 53).

Most early philosophers, even before Socrates, have distinguished between mind and body, realising that man is not just a collection of material particles. Prominent concerning the relationship, was whether mind overruled the body, and with this came the argument between determinism and indeterminism, the former which could be described as maintaining that for everything that ever happens, there are conditions such that, given them, nothing else could happen, and such a philosophy depends greatly on interdependence of things and events without exception or not. For example, in ethical determinism, freedom is the determination of the will by what is good and right. Man cannot be free without obedience to the highest will, and in connection with this, God could not possibly be guided by anything except the true good which inspired his making of the world. Of course philosophy had opponents to this version, William James' insisting that reason and intellect should also have a say, i.e. freedom in philosophy, that is we have a right to believe in God or not, as brought out in his publication "The Will to Believe." God is in the world and we do best to co-operate with him in realising common values and purposes.

The determining power of mind over body is argued not  
only/...



only in the ethical and religious fields but also in the logical and physical fields. As regards the former, it was early considered that logic alone suggests that man's will is fettered and that he can really alter nothing. The Greeks seemed to take determinism seriously, the gods themselves making decisions for man, and all that ever happens is all that could possibly happen.

Later philosophy modified this, for example by inquiring first what is necessary or impossible in actions, and not purely unavoidable. Then there is also the problem of the future, do things just "wait around" in order to become present or do they exist in a nebulous state?

As regards physical determinism, theories are inspired mainly by the developments in physical science, the movement of heavenly bodies whose course was determined with mathematical precision. At first rather speculative, as in Aristotle's time, this gradually gave away to experiment and the search for scientific laws. Ancient theories of determinism were submitted to exact scientific scrutiny, which all told, caused man to cease referring events to God's will alone, but also to eternal and immutable laws of nature, the extreme case being that of Hobbes, whose fundamental interpretation was to study human nature according to the basic presuppositions of the science of bodies (physics), and many present day philosophers differ very little also from one of this profound thinker's

viewpoints/...

viewpoints, namely that denying the existence of any immaterial soul or spirit in man, is fraught with the danger at the same time of destroying his need for freedom.

Summary of Chapter Three

Indelible features were stamped on early hominids about a million and a half years ago and are continuous right through in man to-day, for example molar crowns.

Through all this long period brain evolution was also continuing, creating the neural potential for mental capacity. Such a parallel emergence can be roughly interpreted from Figure 1 in the text.

As man's elaborate social traditions began to take over, the evolution of mental capacity began to accelerate, until eventually in the psychosocial state of evolution he was considered capable of transmitting some non-genetic components of culture.

A feeling, thinking brain began to take over, ensuring that man became the dominant type with the still further emergence of mental capacity in the enlarged cortex, with its power of abstraction.

Biologists have noted the important role of chemicals in the functioning of the brain-mind complex, even as vital agents conditioning the power of thinking.

The remarkable working of the human brain supports the theory of some power or vital force promoting an a priori form of knowledge.

References to Chapter 3

- Huxley, Julian (1974). Evolution. The Modern Synthesis. George Allen and Unwin, London, p. 486.
- Tobias, P.V. (1965). Australopithecus, Homo habilis, Tool-using and Tool-making. South African Arch. Bulletin, Vol. 20, pp 167 - 192.
- Broom, R. (1937). On Australopithecus and its Affinities. Early Man : International Symposium. Acad. Nat. Sci. Phil. p.p. 285 - 292.
- Cohen, Sir Henry (1952). The Status of Brain in the Concept of Mind. Journ. of the Royal Inst. of Phil. Vol. 27, p. 201.
- Goudge, T.A. (1964). Ethics and Evolution - a Reappraisal. Toronto University. p. 3.
- Mayr, Ernst (1963). Animal Species and Evolution. p. 656.
- Young, J.Z. (1978). Programs of the Brain. Oxford University Press, p. 42.
- Rideau, Emile (1965). Pere Teilhard de Chardin. A guide to his Thought. Collins, London, p. 99.
- Jonas, Hans (1966). The Phenomenon of Life : Toward a Philosophical Biology. Harper & Row, p. 91.
- Sherrington, Sir Charles (1955). Man on his Nature. Penguin books. Chapter 4. The Wisdom of the Body.
- Cohen, Sir Henry (1952). Philosophy. Vol. 27, p. 199.
- Brain, W.R. (1950). The Physical Basis of Mind. Oxford. p. 47



- Eccles, J.C. (1951). Hypothesis Relating to the Brain-Mind Problem. *Nature*, Vol. 168, p. 53.
- Taylor, Gordon Rattray (1979). *The Natural History of the Mind*. Secker & Warburg, London, p. 300.
- Borek, Earnest (1961). *The Atoms Within Us*. Berkeley Publishing Co., New York, p. vii.
- Geradin, Lucien (1968). *Bionics*. World University Press. Weidenfeld and Nicholson, p. 66.
- Szent-Gyorgyi, Albert (1960). *Introduction to a Submolecular Biology*, Academic Press, New York and London, p. 135.
- Ewing, A.C. (1985). *The Fundamental Questions of Philosophy*, Routledge & Kegan Paul, p. 138.
- Polanyi, Michael (1958). *Personal Knowledge*. Routledge and Kegan Paul, London, p. 5.
- Young, J.Z. (1971). *An Introduction to the Study of Man*. Oxford & Clarendon Press.
- Romer, A.S. (1968). *Notes and Comments on Vertebrate Palaeontology*, Chicago.
- Urmson, J.O. (1976). *Western Philosophy and Philosophers*, (Editor), p. 201.
- Ayer, A.J. (1982). *Philosophy in the Twentieth Century*. Unwin Paperbacks, London. p. 229.
- Taylor, A.E. (1930). *Elements of Metaphysics*. Methuen & Co., London, p. 13.
- Goudge, T.A. (1976). *Neodarwinism, Mental Evolution, and the Mind-Body Problem*. *Basic Issues in the Philosophy of Science*, (Ed. Wm. R. Shea), New York, p. 91.

Romer, Alfred S. (1968). *The Procession of Life*. Widenfeld & Nicholson, London.

Bartlett, F. (1964). *An Experimental Social Study*. Univen University Books.

Warnock, G.T. (1983). In: *Urmson's Western Philosophy and Philosophers*, p. 51.

Broad, C.D. (1925). *The Mind and its Place in Nature*. Kegan Paul, London.

CHAPTER FOUR

EMERGENCE OF MENTAL AUTONOMY

One can safely observe that if subjectivity existed at all in Australopithecines it was not of the same calibre as that of humans to-day, even though the neurological structure as such of the smaller brain is believed to have remained basically similar. Through the long ages of hominid evolution the quality in particular, as well as the quantity, of neuronal development has been a feature, by quality meaning the sophistication of neuronal connectivity, a purely physical process, involving electrochemical transformations as well. The implication to be learned from this is that in the two to three million years of brain volume expansion, there has been a gradual emergence of mental capacity, characterised by subjectivity as a self-conscious phenomenon, also gradually emerging.

Such a phenomenon came to be set apart from natural processes of cause and effect as in natural events. This view, known as animism, is that all manifestations of human life, and in particular the emergent mind, are due to the operation of something that is of a nature "different" to the body, as Mc Dougall suggests (1926), though as a psychologist he is not concerned with the origin of mind but with it as a conceptual system.

The/...

The animisation of mind, that is, the view that it is above and apart from physical brain, derives far back in human history and was also transferred to natural objects which were therefore personified.

Stringent dualism as formulated by the Cartesian view, did not go unchallenged, and early dissenters were Hobbes and Pierre Gassendi, the latter stating that mental activities were fully explicable in terms of "physical distortion of the material of the brain." As an agnostic, Hobbes was severely criticised by Locke, Spinoza and Leibniz, but later admired by Marx for his "pioneering philosophy of materialism."

The body-mind problem dates far back in the history of philosophy, since it really involves the whole problem of human nature, and one way of studying human nature in pre-Cartesian times was the study of physics. This anthropomorphic trend in Scholastic metaphysics and physics was contrary to orthodox religion, and Descartes' widespread success was his attempt to restore the strict spirit of Catholicism, although at the same time he remained a mathematician of great influence. His early attainments were no doubt inspired by the influence of Greek philosophy which had come into full force during the Middle Ages, when the tug-of-war between orthodox religion on the one hand and the philosophy of both Aristotle and Plato tended to draw intellectuals towards physics. It was a case of the primacy of theology or the primacy of philosophy.

In all criticisms of dualism, there is noted a call for economy in metaphysical speculation and a keeping to true facts, while not actually condemning non-speculative metaphysics. There were, in fact, a number of good reasons to turn from the orthodox animistic model, apart from what has been said above. There is, for example, modern technology, such as surgical advance, psychology, electro-technology and biophysics. Also empirical data such as growth of brain volume and emergence of corresponding intelligence. The study of brain structure as well provides sufficient condition for mind. Furthermore, surgical interference with physical brain impairs cognitive self, while splitting the brain in two, leads to dual minds. Damage to brain also damages behaviour.

As regards the theoretical, conceptual models are thought to be related to electromagnetic pattern distribution, while the neuron itself is an "on-off mechanism" affecting the nervous system. Wilson observes (1979) that the real force of scientific evidence lies in the progressive erosion of the orthodox concept of mind as something independent of physical objects and forces and their complex dynamic relations. One prefers not to maintain independence, otherwise the evolutionary theory of emergence would make no sense, because if there were not dependence there would be nothing left to call mind.

The foregoing arguments led right to the crux of the matter, namely the brain-mind identity theory, disputes about

this/...

this theory actually leading beyond the philosophy of mind, mostly because the material world of science shows the basic composition of sub-atomic and atomic particles or energy quanta, in incalculable permutations and hierarchically ordered combinations throughout a universal mass-energy quantum. Eccles states (1951) that scientific hypothesis such as above would "represent an extension of natural science to a field of non-sensual concepts, and even to a field outside the matter-energy system of the natural world." Sherrington holds a similar view. In fact, it is hardly desirable that we should ignore or discount relative scientific facts.

It is the spectacular successes of science that point philosophy to the view of brain-mind identity. Further, human mentality, rationality and even purposefulness, now stand among the phenomena that come within the compass of scientifically-based explanations. Because of such advances, the brain-mind identity theory is among the most discussed topics on the current philosophical scene, and in fact the identity theory is central to the contemporary physicalist view.

Without detracting from the fundamental philosophy of identity, Wilson (1979, loc. cit. p. 67) states that it has become something of a convention to distinguish three significant variants to the theory, namely the raw feel view, the critical realist view, and the eliminationist view. The  
first/...

first is associated with Russell, Feigl and Pepper and is characterised by the sophisticated quasi-idealist view that the "physical," with which the mental is identified, is ultimately constructed out of the immediate data of consciousness or "raw feels" or direct acquaintance. A weakness here is that the brain-state universals or pure episodes of direct experience or raw feels," (named as such by the American psychologist E.C. Tolman), are in fact rarely encountered, and are an analytical abstraction from ordinary adult experience. Hence one could label such identity as "weak," if "raw feels" could not be dismissed as implausible. If they could be dismissed, the form of identity would be "strict."

The critical realist version of identity is better known as "central state materialism," and is associated with Place, Smart, Armstrong and others, and specifies that the true nature of the mental is really a particular or sentient and sapient sort of physical process, namely that of the central nervous system, the physical process being ontologically, though not epistemologically, primary. The mental is thus held to be continuous with the inanimate world described by physics. This version was later formulated by extending the "central state" account to the "whole range of mental phenomena," and in such a case would continue to be strict identity, though certain irresolvable qualities are a "worrying" factor. This form of identity also does acknowledge immediate inner experience, but regards it as of trivial consequence. Armstrong in omitting  
mind/...

mind, as he strictly does, leaves out a feature that is least amenable to a materialistic interpretation.

The last of the three variants of the identity theory, namely the eliminationist version, is characterised by the thesis that the mental that is identified with the physical, is nothing more than a verbal fiction.

Richard Rorty of Princeton University is critical of the use, or misuse, of language and deviant uses of words, uses which in fact result from a confusion between the uses of two or more senses for the same term (1965). Later on in his publication, Rorty refers to the mind as "that great dumping-ground of out-dated entities." Other philosophers, such as Feyerabend and Cornman, think along similar lines. Nevertheless, however, whisking away concepts on the grounds of cunning verbal disguises, may not always be verifiable. What is really at danger, is "untrammelled speculative metaphysics." Mind functions conceptually, and much of the confusion in the orthodox view of mind, has remained undetected because the grammatical correctness of expressions employing substantive "mental" terms disguises their categorical irregularity. The orthodox concept of mind as a substance is regarded as a "specious, para-mechanical hypothesis, a verbal mirage."

In the evolutionary context, as envisioned, mind,

because/...



because of its natural and necessary emergence, is an organising "ability" of the infinite complexity of the neuronal brain. Its particularly rapid and efficient emergence as an organising function of the brain in the cultural period, was, and is, out of necessity to enable man to cope, and not be a moron. Organisation of the neural brain is a non-physical urge permeating the brain's neural network systems. On the basis of its gradual emergence, mind is not defined as a substance, but by a naturally emerged force, organising the electro-chemical connectivity of the brain as dictated by the process of evolution.

In referring to a university as being well organised we do not refer to the architecture but to the staff. It is "in the sense" that the staff is identical with the university that the mind is "identical" with the brain, if such a model is permitted. One can only "assume" that mental activity is disposed to work in a certain direction, that is, whether the neural basis for mentality can by analogy be referred to the natural environment basis of an overruling Creator. It is extremely difficult, if not impossible, to attempt to discover criteria for identifying or individuating non-spacial substances whose existence is somewhat continuous with corporeal persons.

Mind is not only undefinable and undescribable, but has no physical content. It cannot be saddled with the need for austere self-discipline to keep strictly in step with neuro-  
physiology/...

physiology, for example, and beyond that, no one really has the faintest idea of how actually to correlate the higher mental processes with cerebral structures, which are assumed to serve them. The Russian neurologist, Luria, has attempted this but without great success (1973). Luria, according to Young (1978), does not hesitate to speak of the brain as the agent that "creates" models of the future, thus largely by-passing problems of the role of mind.

Over and over again, search for concrete information about what mind "is", as apart from what it "does," brings one up against a blank wall. The German physicist, Heisenberg (1953) once wrote, "Anybody who desires to understand something of modern atomic theory, will do well to study the history of the atom in order to become acquainted with the origins of those ideas which have come to full fruition in modern physics." Regrettably, nothing yet in mental analysis corresponds, even remotely, to nuclear physics, and any theory of what mind "is" also remains very remote. However, what mind does, (however speculative), is instructive in regard to a subject (brain-mind relationship) which has haunted philosophy ever since Anaxagoras and Heraclitus meditated on the nature of man and the universe. The ancient Greeks were indeed aware of the profound riddles posed by attempting to come to terms with the nature of mind.

After such as Epicurus and Lucretius, materialism was little in evidence until after the long scholastic tradition of Aristotle/...

Aristotle, in fact right up to the eighteenth century when d' Holbach, Lamettrie (1747) and Hobbes held the floor. It is claimed that Descartes actually opened the door to extreme materialism by his separation of body and soul.

The materialism of the nineteenth century was expounded notably by Thomas Huxley, and in the twentieth century by Watson, Hebb and others, and presently very strongly by D.M. Armstrong (1971), who is possibly the most influential, though Smart, Place and Feigl are also strong advocates. Hocutt observes (1966-7), "Not only has materialism returned, but it has lost the discouragement Sherrington feigned upon not being able to discover where in the brain the mind is located." Hocutt also states, in passing (loc. cit. p. 377), that "as failure to mean that mental events are brain processes does not prove they are not brain processes, so ignorance of neurophysiology fails to prove that mental events of which we have some knowledge are not in fact neurophysiological processes of which we are ignorant." Which is not surprising, since nothing has ever been deducible about the world from our ignorance. To-day, after over two thousand years of rational philosophy, Sherrington's confession causes us to realise how really ignorant we are about the nature of mind, and still less how it is related to the brain. The first sharp distinction between the soul and the body was in fact made by Plato, holding that the soul could exist both before and after its residence in the body and could rule the body during that residence, a study later taken up by St. Augustine.

Such indeed was a way to avert religious chastisement, up to the eighteenth century, anyway. Even the French materialists of the Enlightenment, such as Lamettrie himself, shrank from concluding that all humans are automata devoid of all mental events, judging by the book Lamettrie published in 1750 under the title "Animals more than Machines," a view that seems to be epiphenomenalistic, in that both animals and men do have mental events, but these are completely causally dependent on bodily activity. Holbach, also, held an identity theory, that thoughts and feelings occur, to be sure, but are physical in nature. T. Huxley also, did not deny thoughts and feelings, but what he objected to was the Cartesian doctrine that in the case of humans, thoughts and feelings constitute a separate, nonphysical substance that can affect the body, that men's thoughts, spiritual intercourse and so on, still appear as the direct emanation of their material conduct.

To-day the body-mind problem is being studied by neurophysiology in great earnest by means of numerous vital experiments, as for example, the search for personal identity in such experiments as those of Sperry in bisecting brains. Evidence from such research has led Sperry to conclude that the "right mind" and the "left mind" are not only distinguishable but may even be in opposition (1966). The implication of such research is that, since the purely physical subdivision of the physical brain alone is a sufficient condition for the subdivision of mind also, then the existence of an appropriately  
functional/...

functionally integrated brain is alone a sufficient condition for both mind and consciousness.

Further evidence would suggest that mind and personality may be based only in the functional integration of brain sub-systems.

Over the centuries there have been two principal ways of establishing the status of person. With the Greek and medieval philosopher it can be said that the problem lay between the soul and the body, the term soul signifying among the Greeks the term intellect or reason, a concept that still lingers to-day. The soul is what makes something alive, so that even plants have souls and humans reasoning souls, the reasoning faculty setting them apart and above all other animals. Nowhere is there a conception of an inner or private life, and such never existed until Descartes came on the scene. It was he who mostly raised the problem of how body and soul (mind) were to be reconciled, or how they were to interact. In fact interaction posed a serious difficulty, even as did Spinoza, with his claim that body and mind are one, that is, he considered the mental and the physical as two aspects of a single substance, or in the case of Leibniz, mental events are parallel to bodily events with no causal relationship.

The approach to the place of mind with regard to the human brain is an historical problem, but all along, the  
primary/...

primary certainty has been experience, the immediate realisation being that experience is not a physical object but something mental. Though mental is unanalysable, the unanalysable is not unknowable, and we do know quite a lot about the mind by experience, though we cannot explain it in terms of anything else, so that a person could understand what it was like if he had never had the experience. Therefore, quite obviously the obstacle to analysing brain or body-to-mind relationship, is having no clear concept of what mind is. A large number of statements have been made as to what mind stands for or represents, but none as to what it "is."

The important feature considered here is that theory holds mind as a reflection of self (Eddington), and it has developed "functional ability" in conjunction with neuronal brain. One can say with reasonable certainty that it is developed brain connectivity, which accounts for differing levels of mental capacity.

The theory that the brain, in its course of evolution from early hominids, has evolved the potential to produce stages of increase in mental capacity, raises the question of emergents, that is, that mind progressively emerged as neuronic brain progressively enlarged in volume, as depicted in Figure 1. It is not felt that the emergence of mental capacity was that of a novelty, of which there are many examples in evolution, or on the other hand that it was unpredictable. Rather was it a logical consequence.

As regards the further stage of emergence, namely that of subjective phenomena from mental capacity, it is held that subjective phenomena emergence are adequately justified or explainable on the basis of the "rarified" complexity of mental phenomena. In other words, the nature of mental capacity is sufficient in itself to account for subjective phenomena. The doctrine of emergence has been carefully examined by Kekes (1966), and has been the basis of much sound reasoning. In this respect, mental concepts as ordinarily regarded, cannot be entirely ontologically neutral, that is, "inner disposition states" and could not ever have been entirely linked with the central nervous system or brain states, that is, as stated above, the emergence of mental states was not at any time a novelty. It is as well to quote Ewing in this connection. He observes (1985), "Many thinkers have called the qualities of mind and life emergent properties, by which they meant that they emerge from, but are not explained by, what went before. This is certainly so at the level of human knowledge, but if it is merely meant that the causation of these qualities is unintelligible to us, this is the case not only as regards them but as regards all instances of causation in the physical world. The assertion of the "emergence theory" must be viewed as mainly a denial of the principle that a new kind of quality cannot come into being, but those expositions of the theory I have read usually left it obscure whether the emergence of the new

qualities/...

qualities was supposed to have causes but causes which did not render them intelligible or whether it was supposed not to be caused at all."

Scientists generally put the problem of emergence to one side by referring to neurological mechanisms as "the substrate for mind." A further explanation is that of interaction. For example Sperry claims that "mind is an emergent property of cerebral excitation." In the course of evolution, awareness developed into self-awareness, self-awareness into reflection. And Sperry is definite that mind can affect the brain as well as the reverse. Taylor points out (1979), the expression is dualist and Sperry does not really face up to the underlying question of "how" this comes about.

A feature which deepens the veiled meaning of mind is the manner in which one mind can act on another at a distance without communication through the senses. Telepathy and other extra-sensory activities have been extensively studied by such scientists as J.B. Rhine ("Extra-Sensory Perception," London, 1935), and G.N.M. Tyrell "Some Experiments in Undifferentiated Extra-Sensory Perception," J. Soc. Psych. Res., 28, 52). Work such as this, according to Julian Huxley in his classical volume "Evolution" p. 574, "is now forcing upon the scientific world a subject demanding close analysis."

This form of mental communication reveals that the mind  
has/...



has undiscovered powers, though such powers continue to elude analysis. The Society for Psychical Research has been founded for over one hundred years without producing any reliable data. There are two generally accepted theories, however, the first being that telepathy is some form of extension of our existing senses by a non-magnetic normal force, and the second, that all minds are in touch but generally ignored. It will be recollected that C.D. Broad, who disliked speculation, was a calm and reasonable teacher, with a cool and cautious temperament, and he took a deep interest in psychical research. He regarded paranormal phenomena as due to the persistence after death of a "psychic factor," which had previously formed together with the brain and nervous system, a "compound" of which mentality was an emergent quality.

The question appears to be whether we can know of the existence of minds other than our own, the possibility of which, according to Ewing (1985, loc. cit. p. 120) is difficult to logically disprove. Ewing considers it preferable not to claim direct awareness of other minds, because the belief in other minds is too natural and instinctive for it to be possible to account for it by argument at all.

The problem can be left to rest by assuming that paranormal events are at a level higher than Alexander's fifth emergent and thereby acquiring a hitherto unanalysable dimension. What is really of concern is the "relationship" of  
the/...

the mental and the physical. To-day the accent is on neurophysiological research, which according to Ryle, quoted by Puccetti (1964), "we philosophers have been chiefly to blame," for various reasons in blocking the progress of research, a statement with which Wilder Penfield agreed. In many respects it is unprofessional that there should be any variance between science and philosophy on so human a problem as body to mind relationship. Both disciplines should work closely together. Sherrington, quoted by Laslett (1957), states, "The physical basis of mind enroaches more and more upon the study of mind, but there remain mental events which seem to lie beyond any physiology of the brain ..... It is a far cry from an electrical reaction in the brain to suddenly seeing the world around one, with all its distance, its colours and chiaroscuro."

Adrian says he thinks an important "part of our picture" of the brain-mental events may always be missing, and to such thoughts Penfield adds that "something else" finds a dwelling-place between the sensory complex and the motor mechanisms of the body, and quite recently stated that brain and mind must be conceived as separate "entities" having each a distinct essence. (See : "Pavlov in Retreat," the Observer, London, April 23, 1961).

The above paragraphs show scientists are as much confounded as philosophers by the perplexing problem of  
brain-mind/...

brain-mind relationship which ever since the days of Aristotle has arrived at no clear-cut solution.

It looks as though the trouble with professionals, as Russell Brain concludes (1957, in loc. cit. P. Laslett, "The Physical Basis of Mind"), is that in the nervous system scientists are "looking at the threads, while with the mind we perceive the patterns, and one day we shall discover how the patterns are made out of the threads." Russell Brain's metaphor is apt, since patterns (mental concepts) emerge from utilization of the threads (neurons). In a certain sense, the threads constitute the pattern and in that sense there is interaction.

One could really name Spinoza as the founder of the identity theory, when in his "Ethics", Part 1, Axiom V, he wrote of extension and thought as two attributes of one substance, not interacting, but each infinitely diversified into modes which "occur together." The most interesting case of this occurring together is in human beings, where mental events are paralleled by physical events. The mind is "the idea of the body" (1983, see Urmson, "Western Philosophy and Philosophers," p. 274). Contrary to Descartes, Spinoza maintained that only like can affect like, and two distinctly different ultimate substances could not affect each other. Consequently, he sought to solve the mind-body problem by uniting the two as one and the same substance. Each is merely an aspect, an attribute of substance, as stated above. Substance is the ultimate

ontological/...

ontological reality. Thus when any effect is taking place in either mind or body, it is actually one and the same substance itself that is being affected, which in turn affects all of its attributes. The body cannot determine mind to think, neither can mind determine body to motion or rest. In fact, Spinoza claims that wherever there is body, mind will always accompany it.

Such words were written over three hundred centuries ago and their deep insight into a nagging problem, really anticipates contemporary philosophy and even neuroscience, so without doubt Spinoza can be regarded as the first to lucidly present the theory of identity.

In contemporary times, Herbert Feigl, the American philosopher, may well be considered the leading authority on the nature of the mind-body problem, which Anglo-Saxon philosophers have actively inherited through Descartes, and which has been compounded by the empiricist heritage of Hume.

To-day, philosophers such as Feigl, proceed on the assumption that there can be no subjective phenomena and that the solution of the problem must stand or fall with the adequacy of the dictates of a unitary set of physical laws. Feigl does admit "it makes perfectly good sense to speak of the subjectivity or privacy of immediate experience" (1957), but  
such/...

such raw feels are identified with certain "brain state" universals. Wilfrid Sellars (1965) of the University of Pittsburg, is not satisfied with the indeterminate nature of brain-state universals and suggests that they should be submitted to neurophysiological analysis by reducibility to micro-physics with a more adequate theoretical explanation of the nature and function of subjective phenomena. Feigl admits difficulties ahead for metascientific study, that is on the "results" of both science and the logic and epistemology of scientific method. In other words "there is plenty of work left for philosophers in the logical analysis of intricate relations between phenomenal and physical terms."

The above really calls for further philosophic and scientific analysis to eliminate the "crudeness" from materialism (identity), which assumes that the only entities existing in the world are atoms, aggregates of atoms and that the only properties and relations are the properties of, and the relations between, such aggregates. On the other hand few contemporary philosophers will deny that mental processes are things with which we are "directly acquainted," and further, that there can hardly be any doubt that they can be known completely and with certainty. Actually, one has the impression that in Feigl's later years, those bugbears of positivism, subjective phenomena of immediate awareness, cannot be dismissed out of hand, and can be understood in an "unobjectionable way," though he does not specify. One significant statement Feigl does/...

does make is, "My latest statements are controversial," all of which goes to reveal the utter complexity of the relationship between mental and physical, and the realisation that though teleological and mechanical causation exclude one another and that the former cannot be analysed in mechanical terms, so much of our mental life is purposive and that introspective events, though they must have an explanation, occupy no space. If they are not in space, many difficulties arise which would appear to be less perplexing by a non-Cartesian dualism such as that of postulating that mental "things" are in one space and physical things in another, and that they interact from that standpoint.

Feigl leaves open the scientific concept of the openness of the mass-energy substrate, and regarding physicalism, its proper function is to attempt to analyse and render a coherent account of experience in terms of basic physical concepts alone.

Materialists have little option if we accept Aristotle's statement of mind's unification with God, or allied to that, Broad's thesis (1925) that mentality is an emergent characteristic composed of a living brain and nervous system and "something" which is called a psychic factor.

Armstrong, according to Wilson (1979, loc. cit.) has unquestionably demonstrated the "intelligibility and coherence"

of/...

of the materialist physicalist position, a fact which has not always been appreciated. But there is a commitment to behaviourism in shifting the focus of attention from the behavioural stimulus to the response, so leaving out that feature of "the mind" that is found to be least amenable to a materialistic interpretation. The fact is that one has continually to revert to the old saying that a brain does not sufficiently resemble a human being.

Eccles (1977) asks the very important question : "How did self-consciousness come to primitive hominids?" but skirted the issue by replying that, what triggered the beginning of the gradual emergence of self-consciousness was curiosity and exploratory sense. Later what lifted up the primitive hominids was the beginnings of linguistic communication on a sophisticated level. By skirting the issue, he did not explain the beginning of consciousness at a much earlier stage and its emergence to consciousness of the self, though he does admit that highly skilled tool-making did precede language. Later in the discourse, Eccles also did refer to the "rate of growth of the brain." When it reached that of Neanderthal man, ceremonial burial gave evidence that primitive man had developed some spirituality, which must have become ingrained in the make-up of early man some time earlier than Neanderthal, but only found its fuller expression in him.

The important point that Eccles does emphasise is that

it/...

it was not only the growth of brain volume, but the development, gradually, of different parts of the brain. He emphasises (loc. cit. p. 225) that far too little consideration to the neuronal machinery involved in the various manifestations of the self-conscious mind, has been given in the past. "Philosophers such as Feigl, Armstrong and others should build their philosophies upon the best available scientific understanding of the brain. Unfortunately, they are content with crude and antiquated information that often misleads them into espousing erroneous ideas." He adds however, "It is not claimed here that our present scientific understanding of the brain will solve any of the philosophical problems" that face us.

Eccles' theory is that of a dualist-interactionist. The brain functions as a machine, but one of almost infinite complexity and subtlety and, in special regions, under appropriate conditions, it is open to interaction with the world of conscious experience. The evolvment of modules or "power units" in the cerebral cortex could give rise to subtle new properties associated with the emergence of self-consciousness. The module is a power unit because it has a system of internal power generation surrounded by its inhibitory action on adjacent modules with their own intrinsic power. Even though there is a form of antagonism between modules, nowhere is there uncontrolled excitation amongst the one to two million modules, each with up to ten thousand component neurons - immeasurably greater dynamic complexity than "anything else that has ever been/...



been discovered in the universe."

The limbic system (that part of the old but still existing part of the brain) was developed from primitive olfactory (smell) connectivity, but now concerned mostly with emotional experience, and shown that conscious experiences are elaborated with their emotional overtones. At the present time there is no explanation of the action that takes place across the interface between the self-conscious mind on the one hand and the modules of the cerebral cortex on the other, which would provide the key to the interaction of mind and brain. However, Eccles does attempt to outline the reasons why he is a dualist-interactionist, basing his hypothesis on factual research. It is probably one of the most comprehensive theories on brain-mind relationship known in the world to-day.

Briefly, the hypothesis is that the self-conscious mind is an "independent entity" that is actively engaged in reading out from the multitude of active centres in the modules of the liaison areas of the dominant cerebral hemisphere. This amounts to a superior interpretative and controlling role upon neural events by way of two-way interaction. In this hypothesis, primacy is given to the self-conscious mind which during normal life is engaged in searching for brain events that are in its present interest and in integrating these into the unified conscious experience that we have from moment to moment, a sort of scanning operation over the hundreds of thousands of cortical modules that potentially are capable of being open to inter-  
action/...

action with the mental world.

The investigations of Sperry and associates led to the discovery of the uniqueness and exclusiveness of the dominant hemisphere in respect of conscious experience, and the conclusion is that it is only a specialized zone of the cerebral hemispheres that is in liaison with the self-conscious mind (loc. cit. p. 358). A further hypothesis of Eccles is that the self-conscious mind exercises a superior interpretative and controlling role upon the neural events, with the further conclusion that the unity of conscious experience is provided by the self-conscious mind and not by the neural machinery of the liaison areas of the cerebral hemispheres. In this way, disparate brain events are synthesised into unified conscious experience of a global character, mind so becoming a controller and organiser of brain. Eccles believes that self-conscious mind emerged precisely for this purpose.

In support of his dualistic postulates and a dualistic hypothesis, Eccles advances several convincing facts as evidence. The first of his observations based on such practical evidence, is that there is a "unitary character" about the experiences of the self-conscious mind. Secondly, there is "a relationship of interaction giving a degree of correspondence, but not of identity." Thirdly, experiments have shown that "there can be a tempered discrepancy between neural events and the experiences of the self-conscious mind," for example in the  
slowing/...

slowing down of experienced time in acute emergencies. Fourthly, throughout our life we are deliberately employing brain events when we try to recall a memory, recapture a word or phrase, or to establish a new memory. Therefore, "there is the continual experience that the self-conscious mind can effectively act on the brain events."

The above important four points, advance the hypothesis that the self-conscious mind (or mind for short) exercises a superior interpretative and controlling role upon the neural events. A key component of this hypothesis is that the unity of conscious experience is provided by the self-conscious mind and not by the neural machinery of the liaison areas of the cerebral hemisphere. In other words, the experienced unity comes, not from a neurophysiological synthesis, but from the proposed integrating character of the self-conscious mind.

Such a convincing hypothesis of course presupposes in the first place that the self-conscious mind has already emerged in order to give this unity of the self, in all of its conscious experiences and actions. It would appear that the first effective emergence of mind would be in the region of the earlier-mentioned modular activities in the liaison areas of the cerebral cortex, as outlined earlier. In this respect, it has to be recalled that mind exercises, through its increased emergent status, an all-embracing organising ability over the brain's neural machinery. The present theory here is that in  
primitive/...

primitive hominids, such as the Australopithecines, such emergence was in its very early stages and the neural machinery proportionally inadequate, about one third of the brain volume of modern man being in existence.

A further point of interest is that there is actually a "time delay" between what may be termed the "instruction" of the mind, to pass through the complicated brain machinery, before resulting in action, a delay of about eight-tenths of a second. Presumably the time is required in building up the requisite spatiotemporal patterns in millions of neurons in the cerebral cortex.

In this hypothesis, the assumption must be advanced that there is an "essential functional meaning" in all the discrete neuronal actions in spatiotemporal patterns, otherwise there would be a loss of information. This involves further knowledge of the "inner dynamic life" of a module with its ten thousand or more neurons, that, while it is a component of the physical world, it is scanned by the self-conscious mind and its activity organised, and can even make adjustments, so that, for example, hasty "changes of mind" can be made in emergencies. It is an essential feature of the hypothesis that the relations between modules and the self-conscious mind are reciprocal, the self-conscious mind being both an activator and a conscious experience. In a more intimate sense, one must not visualise mind as "passing over" the modules, but as "intimately probing into/...

into them" and at the same time interpreting and organising the "machinery" for the module. This form of interaction takes place in a very rich system of connectivity.

In the foregoing paragraphs, one notes that a strong dualist hypothesis has been formulated, with primacy given to the self-conscious mind, which can by its scanning operation, actively modify the brain. Sperry (1970), the eminent neurophysiologist, has made a similar proposal, suggesting that the present interpretation would tend to restore mind to its old prestigious position over matter.

The above hypothesis of interaction is not refuted by any existing knowledge. However, what are the philosophical implications of dualistic-interaction?

In the first place, one could simply dismiss the problem by denying one or other of the elements, such as did Hobbes, Lamettrie and T. Huxley. On the other hand, one could adopt miraculous intervention, such as did Malebranche's occasionalism, which "adjusted" the relation between two things which appeared to act on one another but really did not, e.g. muscular movements following volition are merely an example of causation, which is only apparent because God is between the two.

Another/...

Another solution is the monadology of Leibniz which agreed with Hobbes, but only in the sense that all bodies are ultimate quantum of force, active entities, the essential nature of all bodies being force or activity or vitalism. In this theory each monad itself has a "thought life" or inner mental activity. Interpreted, this implies that the neurons themselves possessed inner drive or inner desire and each monad joined with all others to represent the entire universe. Following through Leibniz's theory, the neurons could not exert any causal influence on self-conscious mind, while, on the other hand, they are not concerned with interacting with the body. The central monad is God, and each monad has its own peculiar individual nature under a pre-established harmony. So, in a sense, while Leibniz does not imply interaction, his vital monads, each in their own individual way, do contribute to the harmony of living matter.

There is also psycho-physical parallelism, which is the view that physical processes and nervous processes vary together, a conception of causality acting between body and mind, or vice versa. Leibniz's pre-established harmony largely "sorted out" difficulties here, as also did Spinoza with his view that mind and body are parallel manifestations of a single Infinite Substance, which of course "healed" Descartes' dualism.

Without giving consideration to the positivistic

assertion/...

assertion that the whole problem is misconceived in the first place owing to conceptual confusions arising from misuse of language, attention could be given to Sherrington's intriguing body-mind interaction mechanism, which appeals to the physical principle of action at a distance, by analogy with electromagnetic and gravitational force-fields, but it has not found general appeal.

As far as philosophy is concerned, reference to the obvious correlation between certain bodily and certain mental events, is to assert that the bodily and mental events correspond to each other because they are different attributes of the same substance. On the other hand, interaction asserts dualism and that mind and body are different substances, their interaction sometimes being confused with parallelism, the fact that they run parallel, not because there is a causal connection between them but because they are different sides of the same thing.

The difficulty of drawing conclusions from physiological antecedents about mental events must be emphasised, because in the first place the brain cannot be observed fully when a man is conscious. On the other hand prediction of future mental events from past outward behaviour is usually only effected by the indirect process of going back to the mental states we suppose accompanied or immediately preceded the outward behaviour, and onward directly from that to the future mental events we  
predict/...

predict.

One has to examine many circumstances before wholeheartedly accepting dualistic-interaction because in the very first place the neuro-scientist, leaves one with complete uncertainty what mind "is". We know that it is in time, but not space, and any argument across this category difference lacks complete verifiability. This can be disputed, of course, by saying there is an intelligible connection to explain mental-physical interaction, only we do not possess sufficient intelligence and knowledge to discover it. The fact of such lack of intelligence should not constitute a valid objection against it. To this is added the statement by realists, that we know very little about the internal nature of matter, insufficient in fact to definitely assert what it can and cannot cause. With such an argument, it is likely Teilhard de Chardin, for example, would agree.

A denial of interaction would be to preserve a complete water-tight mechanical system, but it has to be realised that mental characteristics are very different from mere bodily characteristics, and so there is no reason to suppose that the mode of causation they exercise is not very different as well. On the other hand, all ordinary empirical data are causally related to mental, and vice versa.

Many philosophers deny and even reject the possibility  
of/...



of empirical science ever deciding metaphysical issues, or for that matter, the case in postulating self-conscious mind as a determining factor in brain manipulation. One such philosopher is Rose (1976). Purely physicalist data require to be within the bounds of a theistic world picture.

Eccles believes (1977, loc. cit. p. 557) that the self-conscious mind has a "mysterious relationship with the brain, and as a consequence achieves experiences of human love and friendship, of the wonderful natural beauties and of the intellectual excitement and joy given by the appreciation and understanding of our cultural heritages. Is it that this life of ours is simply an episode of consciousness between two oblivions, or is there some further transcendent experience of which we know nothing?"

He also says, dualistic-interactionist hypothesis, "implies that man is much more than is given by this purely materialistic explanation. I think there is mystery in man, and I am sure that at least it is wonderful for man to get the feeling that he isn't just a hastily made-over ape, and that there is something much more wonderful in his nature and in his destiny."

A little later, referring to the evolutionary origin of mind or self-consciousness and the way it emerged in relationship to the brain, he points out that there is "some  
kind/...

kind of emergent evolutionary process," and added, "if in its origin it is a derivative of the brain even in this emergent or, if you like, transcendent way, then in the end we are becoming somewhat allied to the monist-materialists." All of which could make mind simply a "spin-off" from the highly developed brain, and "simply use it to act on the brain in all the ways we have been talking about."

The question which still remains unsettled is when, far back in time, did mind clearly emerge in the hominid line of primitive man? There is mystery surrounding such a transcendent emergence, as Dobzhansky implied there was (1967) since there is only conjecture as to when such a quality came to be grafted onto the brain.

Whatever evidence can be given is derived from artifacts (if any in very primitive hominids) and such clues found alongside fossils, but these would be merely evidence of creative intelligence. A second guide could be that, while still remaining completely within the theory of natural selection, that living things, the human animal from the very earliest times in particular, is invested with creativity in order, in the case of man, to tame his animal nature and harness or inhibit the inherited brutality in him. Some would say this is achieved by divine invisible beings at all times observing our behaviour. This belief was preached by Gorgias of Leontini several hundred years B.C., such as a basic belief of his being, that/...

that if anything did exist, we could never know it, and if by chance we should come to know it, such as by intuition, we would not be able to communicate it to others.

Possibly it is preferable to regard creativity in an almost Bergsonian sense. He was a biologist as well as a philosopher and was a most influential exponent of the evolutionary school of his times. The central thesis of his Vitalism was that life is an autonomous function controlled by its own laws instead of the laws of physics and chemistry. Such laws are not in a state of becoming, but are basic assets, and the chief constituent is a vital impulse comprehended as life or consciousness, which can only be understood by intuition, as it is truly an investiture of God for living things, with the inference that they can evolve by natural selection and apply it with increasing advantage.

It has to be appreciated that the identity theory as pronounced by Armstrong, Smart and others, is not satisfactory because by intention it is a purely physicalist theory, causal explanations being in terms of strictly physical theory, and makes little concession to the fact that human life is closely linked with mental processes. Epiphenomenalism, as is well known, holds the theory that mental or spiritual entities are not realities in their own right but merely by-products of matter which perish when their material base is dissolved. Soul and mind are just body in motion, the activity of a physical system/...

system. If one could demonstrate that the mental event always came after the brain event with which it is correlated, it would prove it was the brain which caused the mental event, a process which, as has been noted from the foregoing pages, is not easy to assimilate. It has also been noted that parallelism is a "one way" version of epiphenomenalism.

On the other hand, interaction maintains that brain events and mental events hold both ways, that is, there is reverse action, for example in consciousness having a real biological survival value in that it would organise the performance of the whole animal and effectively control its reactions to situations. In later version, such as that of self-consciousness in the human brain, the value goes further and is extended to spiritual input and output as a concern of the brain-mind complex.

Interaction, instead of acting "through the pineal gland," acts through neuronic modules in the brain itself. Descartes did put forward an interactionist theory, but it required the clarification of neuroscience to bring the theory closer to possibility.

Ewing states (1985, loc. cit. p. 123) that a philosopher "should be an adept at casting doubts on the apparently obvious." His answer to interactionism would be that some other way/...

way must be found, to those who object in the case of interaction, by explaining the empirical facts which show that there is at least a very frequent correlation between certain bodily and certain mental events. The most popular way of doing so in modern times has been to assert that the bodily and mental correspond to each other because they are different attributes of the same substance. If one could not explain causality on the basis of same substance, the only recourse would be God.

As regards being the same substance, we already know so little about the internal nature of matter, that it is difficult to decide what it can and cannot do. Nor is it clear that we know a priori that cause and effect cannot be unlike, but we do know that bodily and mental events are at any rate both in time and, most important, that mental events are in "some way" spatially localized.

The phenomenon of mental autonomy which has gradually emerged with development of brain, now threatens to become an overruling force in human affairs. So powerful is this force that to-day man finds himself "plunged into great puzzlement, uncertainty and insecurity," as Rauche states (1985); also earlier he pointed out (1974) that the new concept of knowledge as it emerges with the discoveries of physics is best illustrated by Heisenberg's uncertainty principle, which he formulated for his quantum physics. Such research in physics represents a crisis of knowledge leading to the unknowability of  
matter/...

matter, which may also be regarded as denoting the inadequacy of human insight into the nature of causality, hence man's present preoccupation with functionalism, operationalism and actionalism and blinding him to his own true nature.

Man's movement forward in emergent evolution is correlated with the development of the brain-mind complex, basically a physical process because of the progressive refinement of the organisation of the neural network.

Therefore, while we trace the origin of social, ethical, moral and religious obligations to man-made sanctions, they are really by-products of a process of natural emergence, initiated at the very beginning of life on earth and which living things would be unable to halt owing to original embryonic development under the control of inherited DNA, together with standards of conduct related to the settings of these physical standards in the brain.

Mental autonomy it would seem, in conclusion, has not rescued man from savage and destructive warfare which has characterised human existence since earliest times. Regrettably a spirit of insolent pride (Hubris) also exists, initiated by the remarkable advances in science and physics. Furthermore, it is present in much of the philosophy of to-day, which, to quote Rauche again (1974), is "inextricably linked with the dynamic, critical/...

critical, controversial and reflective nature" of thinking, blinding and preventing man from leading his existence as a free individual within the cosmic pattern.

In short, he faces an impasse at this stage of philosophic thinking and one cannot help feeling that he has tended to sever himself from the true natural environment, either by unwittingly destroying it, or by regarding it as hostile.

The concern of this thesis has been to show how man has biologically evolved in the natural environment, with particular emphasis on the gradual natural emergence of his now remarkable mental capacity. In consequence, then, it seems quite irrational that he should in any way, either wittingly or unwittingly, disrupt the milieu to which he owes so much.

Summary of Chapter Four

Descartes by his philosophy of dualism, restored the strict spirit of Catholicism, discarding the anthropomorphic direction in metaphysics and physics inherited from the Greeks.

In recent times, research in neurophysiology has been increased, the trend in thought being that mental capacity was intimately tied-up with physiology. The philosophy of brain-mind identity, appearing frequently in present day publications, concentrated on this aspect.

Despite the intensity of contemporary biological and neurophysiological research, the nature of mental capacity continues to remain elusive. However, a reasonable interpretation is that what is known as mind is an organising ability within the neural brain complex, creating models for the future.

In the course of emergence of mind, awareness evolved into self-awareness, and consciousness into self-consciousness. In fact there are many little understood aspects of mental capacity which lie beyond understanding and by many are grouped under psychic factors.

The hypothesis of dualistic interaction is considered a realistic exposition of brain-mind relationship.

In/...



In particular the interpretation of the performance of inner dynamic mental forces by brain neuronc modules, seems important.

The feature of man's so-called cultural stage, dating back some thousands of years, has been the fuller attainment of mental autonomy. Such a remarkable mental state, however, is not without complexity, much of which refers back to the influences of man's long history on this planet. Indeed such realisation should provide him with a deeper understanding of the problems inherited also in mental autonomy.

It is anticipated that as mental autonomy develops further in emergent evolution, greater fulfilment and closer harmony may well be achieved by man.

BRIEF OVERALL SUMMARY

In the process of evolution of man dating back some two million years or so, the physical brain has increased three fold in volume. Such increase was rapid in the last three hundred thousand years or so, associated more or less with the so-called cultural stage.

The emergence of mind, or mental capacity, followed suit, suggesting that this faculty was closely connected with progressive brain development.

The hypothesis exists that mind could not have emerged from inert physical matter (brain) unless matter contained in itself a "forward essence" at its creation.

It is maintained that the evolution of the highly sophisticated neuronal brain structure has resulted in the remarkable emergence of mind in man.

To such an extent has this mental capacity evolved, facilitated by the miracle of neuronal structure and connectivity, that it has now emerged into a state of autonomy.

Such mental autonomy brings with it difficulties associated with the process of living under rapidly changing conditions, and as a result mankind is becoming acutely aware of continued need for responsible reappraisal of future direction in human affairs on this planet.

References to Chapter Four

- Mc Dougall, William (1926). An Outline of Psychology.  
Methuen and Co., London.
- Wilson, Edgar (1979). The Mental as Physical.  
Routledge and Kegan Paul, London, p. 60 & 67.
- Eccles, J.C. (1951). Hypothesis Relating to the Brain-Mind  
Problem. Nature, Vol. 168, p. 53.
- Rorty, Richard (1965). Mind-Body Identity, Privacy, and  
Categories. Review of Metaphysics, Vol 73, p. 53.
- Luria, A.R. (1973). The Working Brain : An Introduction to  
Neuropsychology. (Transl. B. Haigh) Allen Lane,  
London.
- Young, J.Z. (1978). Programs of the Brain. Oxford University  
Press, p. 41, 18.
- Heisenberg, W. (1953). Nuclear Physics. Methuen, London.
- Lamettrie, J.O. de (1747). Man a Machine.  
A. Vartanian (1960), Princeton University Press.
- Armstrong, D.M. (1971). A Material Theory of the Mind.  
Routledge, Kegan Paul, London.
- Hocutt, Max (1966-7). In Defence of Materialism.  
Philosophy and Phenomenological Research,  
Vol. 27, p. 366.
- Sperry, W.R. (1966). Brain Bisection & Mechanisms of  
Consciousness. In Eccles (1966) p.p. 298 - 313.
- Kekes, John (1966). Physicalism, The Identity Theory, and the  
Doctrine of Emergence. Philosophy of Science, Vol.  
33, p.p. 360 - 75.

- Ewing, A.C. (1985). *The Fundamental Questions of Philosophy*.  
Routledge and Kegan Paul, p. 120, 123 & 138.
- Taylor, Gordon Rattray (1979). *The Natural History of the Mind*.  
Secker and Warburg, London. p. 300.
- Puccetti, Roland (1964). *Science, Analysis, and the Problem of  
Mind*. *Philosophy*, Vol. 39, p. 249.
- Laslett, P. (1957). *The Physical Basis of Mind*.  
Edited by P. Laslett, p. 3.
- Urmson, J.O. Editor (1983). *Western Philosophy and  
Philosophers*. Hutchinson Group, Johannesburg.  
p. 274.
- Feigl, Herbert (1957). "The Mental and the Physical."  
*Minnesota Studies in the Philosophy of Science*, II,  
p.p. 370 - 498.
- Sellars, Wilfrid (1965). *The Identity Approach to the Mind-Body  
Problem*. *Review of Metaphysics*, Vol. 18, p. 449.
- Broad, C.D. (1925). *The Mind and its Place in Nature*.  
Kegan Paul, London.
- Eccles, J.C. (1977). In: *The Self and its Brain*  
Karl R. Popper and John C. Eccles  
Routledge & Kegan Paul, London.
- Sperry, R.W. (1970). *Perception in the Absence of the  
Neocortical Commissures*. In *Perception and its  
Disorders*. Res. Publ.  
A.R.N.M.D. Vol. 48, p.p. 123 - 138.
- Rose, S (1976). *The Conscious Brain*. Penguin, Harmondsworth.
- Dobzhansky, T. (1967). *The Biology of Ultimate Concern*. The  
New American Library Inc., New York.

Rauche, G.A. (1985). Theory & Practice in Philosophical Argument. Institute of Social and Economic Research, University of Durban-Westville, p. 171.

Rauche, G.A. (1974). The Abdication of Philosophy = The Abdication of Man. Martinus Nijhoff, The Hague, p. 3, 4, 78.

BIBLIOGRAPHY

- Armstrong, D.M. (1971). *The Material Theory of Mind*, Routledge, Kegan Paul, London.
- Ayer, A.J. (1982). *Philosophy in the Twentieth Century*. Univen Paperbacks, London, p.p. 177, 229.
- Bartlett. F. (1964). *An Experimental and Social Study*. Univen University Books.
- Beritoff, J.S. (1965). *Neural Mechanisms of Higher Vertebrate Behaviour*. Little, Brown, Boston & A. Churchill.
- Borek, Earnest (1961). *The Atoms Within Us*. Berkeley Publishing Co., New York, p. vii.
- Brain, W.R. (1950). *The Physical Basis of Mind*. Oxford, p. 47.
- Broad, C.D. (1925). *The Mind and its Place in Nature*. Kegan Paul, London.
- Broom, R. (1937). *An Australopithecus and its Affinities*. Early Man : International Symposium. Acad. Nat. Sci. Phil., p.p. 285 - 292.
- Burnet, John (1928). *Early Greek Philosophy*. Macmillan & Co., p. 145.
- Cohen, Sir Henry (1952). *Philosophy*, Vol. 27, p.p. 199, 201.
- Cohen, Sir Henry (1952). *The Status of the Brain in the Concept of Mind*. *Philosophy*, Vol. 27, p.p. 195 - 209.
- Dobzhansky, T. (1967). *The Biology of Ultimate Concern*. The New American Library Inc., New York.
- Eccles, J.C. (1951). *Hypothesis Relating to the Brain Mind Problem*. *Nature*, Vol. 168, p. 53.

- Eccles, J.C. (1977). In: *The Self and its Brain*.  
Karl R. Popper and John C. Eccles. Routledge and  
Kegan Paul, London.
- Ewing, A.C. (1985). *The Fundamental Questions of Philosophy*.  
Routledge and Kegan Paul, p.p. 74, 123, 138, 228.
- Falk, Heinrich (1967). *Can Spirit Come from Matter?* *Int. Phil.*  
*Quarterly*, Vol. 7, p. 543 (Translated).
- Feigl, Herbert (1957). *The Mental and the Physical*.  
*Minnesota Studies in the Philosophy of Science*,  
p.p. 370 - 498.
- Gérardin, Lucien (1968). *Bionics*. World University Press,  
Weidenfeld and Nicholson, p. 66.
- Goudge, T.A. (1964). *Ethics and Evolution - a Reappraisal*.  
Toronto University Press, p. 3.
- Goudge, T.A. (1965). *Another Look at Emergent Evolutionism*.  
*Dialogue*, Vol. 4, p. 283.
- Goudge, T.A. (1967). Teilhard de Chardin, Pierre.  
*The Encyclopaedia of Philosophy*, Ed. Paul Edwards,  
Cromwell, Collier and Macmillan, p. 83.
- Goudge, T.A. (1976). *Neodarwinism, Mental Evolution, and the  
Mind-Body Problem*. *Basic Issues in the Phil. of Sci.*  
Ed. Wm R. Shea, Science, New York, p. 91.
- Groch, Judith. (1964). *You and your Brain*.  
Cassell, London.
- Haldane, J.B.S. (1932). *Science and Ethics. The Inequality of  
Man*. London, p. 113.
- Hamlyn, D.W. (1984). *Metaphysics*. Cambridge University Press,  
p.p. 16, 148.

- Heisenberg, W. (1953). Nuclear Physics. Methuen, London.
- Hocutt, Max (1966-7). In Defence of Materialism.  
Philosophy and Phenomenological Research, Vol. 27,  
p. 366.
- Huxley, Julian (1974). Evolution. The Modern Synthesis.  
George Allen & Unwin, London, p. 486.
- Jonas, Hans (1966). The Phenomenon of Life :  
Towards a Philosophical Biology.  
Harper and Rowe, p. 91.
- Kekes, Johan (1966). Physicalism, The Identity Theory,  
and the Doctrine of Emergence. Philosophy of Science,  
Vol. 33, p.p. 360 - 75.
- Lamettrie, J.O. de (1747). Man a Machine.  
A. Vartanian (1960), Princeton University Press.
- Laslett, P. (1957). The Physical Basis of Mind.  
Edited P. Laslett. Blackwell, Oxford, p. 3.
- Lieberman, P. (1971). On the Speech of Neanderthal Man.  
Linguistic Inquiry, Vol. 2, p.p. 203 - 22.
- Longergan, Bernard J.F. (1958). Insight. A Study of Human  
Understanding. Phil.-Library, New York.
- Luria, A.R. (1973). The Working Brain : An Introduction to  
Neuropsychology.  
(Transl. B. Haig), Allen Lane, London.
- Mayr, Ernst (1963). Animal Species and Evolution. p. 656.
- Mc Dougall, William (1926). An Outline of Psychology.  
Methuen & Co., London.
- Merleau-Ponty, M. (1962). The Phenomenology of Perception.  
Routledge & Kegan Paul, London.



- Moore, G.E. (1962). *Some Main Problems of Philosophy*.  
Collier, New York.
- Polanyi, Michael (1958). *Personal Knowledge*.  
Routledge & Kegan Paul, London, p. 5.
- Pribram, K.H. (1969). *Some Dimensions of Remembering :  
Steps toward a Neurophysiological Model of Memory*.  
In: *Brain and Behaviour*. Ed. by K.H. Pribram.  
Penguin Books, p. 254.
- Puccetti, Roland (1964). *Science, Analysis and the Problem of  
Mind*. *Philosophy*, Vol. 39. p. 249.
- Rauche, G.A. (1974). *The Abdication of Philosophy = The  
Abdication of Man*. Martinus Nijhoff, The Hague.  
p. 3, 4, 78.
- Rauche, G.A. (1985). *Theory and Practice in Philosophical  
Argument*. Institute of Social and Economic Research.  
University of Durban-Westville, p. 171.
- Rensch, B. (1959). *Evolution Above the Species Level*.
- Rhine, J.B. (1935). *Extra-Sensory Perception*, London.
- Rideau, Emile (1965). *Père Teilhard de Chardin,  
A Guide to his Thoughts*. Colliers, London.
- Romer, A.S. (1968). *Notes and Comments on Vertebrate  
Palaeontology*. Chicago.
- Rorty, Richard (1965). *Mind-Body Identity, Privacy, and  
Categories*. *Review of Metaphysics*, Vol. 73,  
p. 53.
- Rose, S. (1976). *The Conscious Brain*, Penguin, Harmondsworth.
- Russell, Bertrand (1948). *Human Knowledge, its Scope and  
Limits*. Allen & Unwin, London.

- Sahakian, William S. (1969). *Outline-History of Philosophy*.  
Barnes & Noble, Inc., New York, p. 3.
- Sartre, J.P. (1943). *Being and Nothingness*.
- Sellars, Wilfrid (1965). *The Identity Approach to the Mind-Body Problem*. *Review of Metaphysics*, Vol. 18, p. 449.
- Sherrington, Sir Charles (1955). *Man on his Nature*.  
Penguin Books, Chapter 4. *The Wisdom of the Body*.  
Gifford Lectures, Edingburgh, 1937 - 38.  
Cambridge University Press.
- Smith, Anthony (1984). *The Mind*. Hodder & Stoughton, p. 116.
- Sperry, W.R. (1966). *Brain Bisection & Mechanisms of Consciousness*. In: Eccles (1966), p.p. 298 - 313.
- Sperry R.W. (1970). *Perception in the Absence of Neocortical Consciousness*. In: *Perception and its Disorders*.  
Research Publ. A.R.N.M.D., Vol. 48, p.p. 123 - 38.
- Szent-Gyorgyi, Albert (1960). *Introduction to a Submolecular Biology*. Academic Press, New York & London, p. 135.
- Taylor, A.E. (1930). *Elements of Metaphysics*. Methuen & Co.,  
London, p. 13.
- Taylor, Gordon Rattray (1979). *The Natural History of the Mind*.  
Secker & Warburg, London, p. 300.
- Teilhard de Chardin, P. (1959). *The Phenomenon of Man*.  
New York.
- Tobias, P.V. (1965). *Australopithecus, Homo habilis, Tool Using and Tool Making*. *South African Archaeological Bulletin*, Vol. 20, p.p. 167 - 192.

- Urmson, J.O. Editor (1983). Western Philosophy and Philosophers. Hutchinson Group, Johannesburg, p.p. 93, 201, 274.
- Warnock, G.T. (1983). In: Urmson's Western Philosophy and Philosophers, p. 51.
- Williams, B.A.O. (1983). Ed. J.O. Urmson, Western Philosophy and Philosophers. Hutchinson Group, p. 75.
- Wilson, Edgar (1979). The Mental as Physical. Routledge and Kegan Paul, p.p. 60, 67, 102.
- Young, J.Z. (1971). An Introduction to the Study of Man. Oxford and Clarendon Press, p.p. 3, 41.
- Young, J.Z. (1978). Programs of the Brain. Oxford University Press, p.p. 18, 31, 36, 38, 42.



INDEX OF PERSONS

(\* Indicates entry in Bibliography as well)

- Adrian, E.D., 125  
Alexander, S., 25, 77, 78, 146.  
Anaxagoras, 139.  
Anaximander, 3, 8.  
Anaximines, 69.  
Aristotle, 7, 31, 36, 43, 76,  
79, 116, 121, 126, 133, 140  
148, 151.  
\*Armstrong, D.M., 136, 140, 151,  
153, 164.  
Augustine, 140.  
\*Ayer, A.J., 61, 63, 64, 72, 73,  
86, 120.  
  
\*Bartlett, F., 116.  
Beneke, F.E., 44.  
Bergson, H., 3, 18, 19, 22, 24,  
120.  
\*Beritoff, J.S., 67, 81.  
Berkeley, G., 78, 117, 123.  
Blake, W., 110.  
\*Borek, Earnest, 102, 104, 105.  
\*Brain, Russell, 100, 148.  
Brentano, F., 55.  
\*Broad, C.D., 73, 116, 119, 146,  
151.  
Broca, Paul, 20.  
\*Broom, R., 17.  
\*Burnet, John, 69.  
  
\*Cohen, Sir Henry, 56, 93, 100.  
Collingwood, R.G., 73.  
Cornman, J., 137.  
  
Darwin, Charles, 8, 19, 26, 93.  
Descartes, R., 39, 40, 53, 76,  
117, 119, 133, 140, 148, 149,  
159, 165.  
Diogenes, 69.  
\*Dobzhansky, T., 163.  
  
\*Eccles, J.C., 47, 48, 58, 67,  
81, 100, 101, 102, 109,  
124, 135, 152, 153, 154,  
155, 162.  
  
Eddington Sir Arthur, 51, 72,  
125, 143.  
Einstein, A., 66.  
Empedocles, 31.  
Epicurus, 139.  
\*Ewing, A.C., 35, 50, 54, 63,  
64, 69, 82, 107, 115, 117,  
122, 124, 146, 165.  
  
Fabre, 8.  
Falk, Heinrich, 43.  
\*Feigl, H., 136, 140, 149,  
150, 151, 153.  
Feyerabend, P.K., 137.  
Foerster, Heinz von, 58.  
Freud, Sigmund, 46, 49.  
  
\*Gassendi, Pierre, 133.  
\*Gérardin, Lucien, 105.  
Gorgias, 163.  
\*Goudge, T.A., 24, 53, 56, 57,  
61, 64, 77, 94, 115.  
\*Groch, Judith, 63.  
  
Haeckel, Ernst, 19, 71, 110.  
\*Haldane, J.B.S., 26, 40, 96,  
98.  
\*Hamlyn, D.W., 24, 76, 80, 123.  
Hebb, D.O., 140.  
\*Heisenberg, W., 139, 166.  
Heraclitus, 19, 140.  
Herbart, 46.  
Hobbes, T., 126, 133, 140,  
158, 159.  
\*Hocutt, Max, 140.  
Holbach, Baron, 60, 140, 141.  
\*Hume, D., 63, 64, 149.  
Husserl, E., 55.  
\*Huxley, Julian, 9, 29, 36,  
91, 92, 93, 94, 95, 96,  
97, 98, 114, 121, 145.

- Huxley, T.H., 10, 65, 94, 111,  
140, 141, 158.
- James, William, 52, 53, 84, 125.  
Jonas, Hans, 99.
- Kant, E., 7, 41.
- \*Kekes, John, 144.
- Koestler, Arthur, 111.
- \*Lametrie, J.O. de, 60, 139,  
141, 158.
- \*Laslett, P., 147, 148.
- Leakey, R.E.F., 26.
- Leibniz, G., 118, 133, 142,  
159.
- Leitas, Nathan, 49.
- Lenin, N., 21, 43.
- \*Lieberman, P., 70.
- \*Locke, J., 73, 133.
- \*Lonergan, B.J.F., 52, 53.
- Lotze, R., 46.
- Lucretius, 139.
- \*Luria, A.R., 12, 139.
- \*Mc Dougall, William, 132.
- Malebranche, N., 158.
- Marx, K., 23, 43, 44, 133.
- \*Mayr, Ernst, 66, 94.
- \*Merleau-Ponty, M., 41, 54.
- Moore, G.E., 73.
- Morgan, C. Lloyd, 25, 77.
- Pavlov, I.P., 147.
- Penfield, Wilder, 21, 67, 81,  
147.
- Pepper, S.C., 136.
- Place, U.T., 136, 140.
- Plato, 20, 133, 140.
- \*Polanyi, Michael, 108.
- \*Pribram, K.H., 58.
- \*Puccetti, R., 147.
- \*Rauche G.A., 12, 13, 166,  
167.
- \*Rensch, B., 57.
- \*Rhine, J.B., 145.
- Rideau, Emile, 30.
- \*Romer, A.S., 48, 109, 116.
- \*Rorty, R., 137.
- \*Rose, S., 162.
- \*Russell, Bertrand, 23, 54,  
69, 72, 85, 117, 136.
- Rutherford, Lord, 36.
- Ryle, G., 56, 147.
- \*Sahakian, William, S., 8.
- Scriven, M., 54.
- \*Sellars, Wilfrid, 150.
- \*Sherrington, Sir Charles, 8,  
47, 48, 56, 58, 63, 72,  
99, 106, 125, 135, 160.
- Smart, J.J.C., 136, 140,  
164.
- \*Smith, Anthony, 59, 62.
- Spencer, Herbert, 65, 93.
- Socrates, 125.
- \*Sperry, R.W., 68, 81, 82,  
102, 115, 141, 145, 155,  
158.
- Spinoza, Benedict, 3, 29,  
117, 118, 133, 142, 148,  
149, 159.
- \*Szent-Györgyi, Albert, 106.
- \*Taylor, A.E., 114.
- \*Taylor, Gordon, Rattray, 57,  
58, 67, 71, 82, 83, 102,  
111, 115, 124, 145.
- \*Teilhard de Chardin, 9, 24,  
25, 30, 40, 44, 47, 61,  
78, 85, 95, 161.
- \*Tobias, P.V., 17, 27, 42, 92.
- Tolman, E.C., 136.
- Tyrell, G.N.M., 145.
- \*Urmson, J.O., 86, 110, 148.
- Waddington, C.H., 66.
- Watson, J.B., 140.
- Whitehead, A.N., 64, 78.
- Whyte, Lance, 82.
- \*Wilson, Edgar, 134, 135, 151.
- Wöhler, Friedrich, 104.
- \*Young, J.Z., 8, 11, 35, 42,  
58, 59, 68, 70, 71, 72,  
79, 80, 81, 82, 95, 101,  
105, 108, 109, 110, 112,  
113, 139.