

Meanderings in Nature, Our World, Its Creation and Evolution - a Personal Interpretation*

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You may wonder why I have chosen the creation of our world and its evolution as a subject to bring before you, and I may say at once that it is because the small part of nature with which we are most intimate, is to me the paramount example given us for teaching purposes, particularly in our sphere of action which deals with life and living creatures, especially men. It is a natural sequence to an address I gave last year on 'The place and status of nature in the ensemble of surgical teaching'. Nature, for anyone, is what he or she finds in it: for me it has everything. Let me put it to those of you who have not seen the former address *en train* with its salient features, as briefly as possible.

THE CREATION

In my opinion, the world and everything in it is a creation, which literally and basically means it is something which has been 'caused to grow', or if you prefer it, 'produced or made'. It is the resulting product. What it implies, is that it is the transmutation and transference of something subjective into something objective, i.e. appreciable to our bodily senses. As such it is the work of its producer or creator, and in consequence, is subject to whatsoever laws its creator may have imposed upon it, which laws are immutable and without exception. The potential (the power to create) usually described as cause, 'that which produces an effect', necessarily *precedes* creation and controls it. By studying the effect, we hope to elucidate its cause—a very common procedure in clinical medicine.

I have never ceased to emphasize that what we see or find out in nature's workings is for us surgeons the most amazing guiding star that one can picture, and I have no doubt this has a much wider, indeed a universal, application. In elucidating nature's secrets one discovers nothing new, but uncovers something as old as creation itself.

As a production, a creation, it is a *technical* achievement, and therefore whatever we find out about it reveals progressively more and more of the ways and means by which its innumerable techniques are employed. Such revelations serve to give us an increasing comprehension of the power behind the creation. I say 'increasing comprehension' specifically, as I am satisfied that full comprehension can never be attained by our limited intellectual capability.

The Power behind the Creation

But let us look first at the basic question, that of the power behind the creation.

Throughout the ages of intelligent man, Chaos, a confused disordered state of unorganized primordial matter, seems always to have been presumed, and then assumed as the primeval condition, and from that evolved the universe, including our world. In the opinion of the 'organic' evolutionists this occurred by chance, a proposition which seems amazing, even incredible. I am reminded once again of Voltaire's remark which I frequently quote, 'If a clock proves the existence of a clockmaker, and the world does not prove the existence of a supreme architect, then I consent to be called a fool'. A product presumes production and a producer, and indeed reflects the individuality of its producer.

The word chance, *cadentia*, means 'things falling', in modern parlance, 'out of the blue'; that is to say, events happening without design or intent, unforeseen, unexpected, and without any known cause, which covers the ordinary scientific description. But 'without any known cause' does not negate the possibility of a cause, and if there be one, chance is automatically ruled out. My own belief, and I am only one of the very many, is that in nature, which includes the whole of creation, *nothing* happens without a cause, and that our failure to find one is simply an acknowledgement of our ignorance, the degree of which can be very much increased by incompetence. I am afraid that self-conceit is apt to be the chief factor in our failure to realize and acknowledge our ignorance, and so also to be responsible for its lack of correction and remedy.

There can be no immutable law if chance comes into the picture with its apparently uncontrollable, haphazard interference; and its lack of design and intent destroys any guarantee that the law would be carried out infallibly.

The alternative opinion, including my own, is that there is definitely a cause or power responsible for the creation of the universe and world, and that cause or power we may justifiably call its Creator. The terms in which we think of the Creator vary with the individual, but whatever they are, they must envisage a Power of such unlimited, infinite compass as to defy any definition or description. For my part, I like to think of the Creator as a personality, indeed the Supreme Personality, as after all, that is the highest concept we humans with our limited brain and intelligence, are capable of envisaging; but the picture must remain clouded and indistinct as the infinite is inherently indefinable. This is no new thought and it conforms mainly to the Biblical description of man as made in the image or likeness of his Creator, implying a personality, and he is complete with the addition of life, and therefore with individuality and all that that entails, though of course, in a very limited way. The feature that I should like to emphasize particularly in relation to my thesis, is the Creator's unlimited and illimitable power, which carries with it the fact that nothing is impossible of achievement that He may wish to bring about.

Keeping in mind, then, the omnipotence of the Creator, let us look at His creation, the universe and world, which must embrace everything in it including ourselves.

I can see no particular reason why we should not accept Chaos as the primordial condition before creation was embarked upon; but from the moment it was begun, we see the display of supreme organization, a plan, purpose or design of incredible magnitude, conceived in its entirety before it was produced, complete to the last detail. It is the supreme example of foresight at its best, its object carried out to perfection. Even *we* try to do the same.

Organization and chance are mutually repellent, whereas disorganization and chance could well be bedfellows. In the same way, trial and error as a *modus operandi*, is limited to us imperfect humans, and can have no place in the presence of omnipotence.

The progressive development of this creation which we label evolution is unfurled to us in a manner that we can understand—the word means a turning out or unfurling. Indeed, evolution necessitates progress and is inseparable from it.

Since we are in and of this world, materialization of a concept is the medium by which that concept is passed over to us, as we are furnished with all the senses necessary for the registration of our total environment, our intelligence coming to our aid in the analysis, criticism, discrimination and judge-

*With the publication of this article we pay homage to a beloved tutor who turned 85 on 14 August 1971.

ment of what information is thus presented. Intelligence, of course, means 'choosing between', a well-selected word.

To help us further to follow and understand the enormous development of our intellect, as compared with the lower animals, time has been introduced, whereby the progressive steps in the improvement of the quality of intellect are registered as intervals of time; time expended, as registered by man, is a means of estimating and appreciating the magnitude of a project. Geological time, in terms of man's life-span, is something formidable, but, in terms of eternity, it becomes insignificant and negligible, even to the degree, relatively, of non-existence. Time is passive, but it offers the opportunity for activity.

On the other hand, in our transient lives it is a very important factor, as we can appreciate from the fact that we control the routine of our daily and other activities by what we call a timetable.

The Unique Element—Life

This brings up the question of life, which is obviously the dominant and unique element in this amazing creation and everything revolves round it. We have to acknowledge at once that we don't know its real nature, but we can get some comprehension of it by noting those attributes and appurtenances that we find associated with it.

'The distinction of living matter is its power of self-maintenance, which is manifested in activities that are characteristically directive'. (Wood-Jones, *Trends of Life*). This statement really gets right down to the core of the matter, and when we speak of the power of self-maintenance we mean the power not only to keep going but also to be able to carry out the whole gamut of the activities we associate with life. Life is non-material, carrying neither mass nor weight, and it must automatically come into the category of what we think of as in the nature of spirit.

In view of our complete impotence to produce life or to discover any other worldly means of doing it, it intrigued me to find the astronomer and physicist, Eddington, while an upholder of chance and its laws, remarking, "To study life and man, we are forced to call on an "anti-chance"—a telling adverse criticism, precluding, I feel, any general acceptance of chance as a basic principle in creation, where life is its very essence so far as we are concerned.

The Role of the Instincts

Life, however, is not a bald sterile gift but, in the lowest as well as in the highest of living creatures, it carries with it a simultaneous endowment with the means of its self-maintenance and the compulsive power to carry them out. I refer to the instincts (derivation—things impelled), amazing directive agencies, which cover all the necessities of life and which are independent of the creature's control. I feel that it certainly aids our humility to know that it is obviously necessary to give us these same instincts as are given to the unassuming amoeba. The refusal, to the individual, of voluntary control of them is one of the kindest and most protective things that ever happened to us, as I am satisfied that, left to ourselves, general apathy and the spirit of *laissez-faire* would certainly have led to an enormous mortality.

These instincts act entirely under the controlling directive power behind them to the complete exclusion of the individual's interference. In this way they guarantee success of their function and represent the delegation of a duty as part and parcel of life and its maintenance, a sort of decentralization, with allocated power, acting as a kind of automation, but still under central if remote control. As I have often emphasized, in man they still control, quite outside his effort, those absolute essentials of life such as respiration, blood circulation, digestion, assimilation, and so on.

Addition of Voluntary Directive Power

However, in man particularly, what we also see with the development of intelligence, 'the potential function of intellect put into action', is that quite a lot of voluntary directive power has developed which can aid that which is inborn. In other words, the instincts themselves act involuntarily compelled by their directive power, while the limited acquired modification of directive power is under voluntary control.

The instincts function chiefly through the nervous system or its equivalent, as even in the amoeba, with no definite structural nervous system, its reactions appear in the nature of reflex ones, while in the higher animals, they are definitely triggered off into action by their specific stimuli, e.g. hunger for eating, thirst for drinking, lack of oxygen for breathing, and so on. Here then this wonderful organization caters for and guarantees the maintenance of life, in spite of ourselves.

I sometimes think of instinct as the precursor of thought and intelligence or as the Creator's substitute for them in those animals in which, so far as we know, they have not yet developed as with us.

It will be readily appreciated that this directive element is an extremely important factor in life and living, which latter for the individual, is life in action. Indeed, we could reasonably well define living as the sum of our potentials, inborn and acquired, including all prospective functions, put into action.

This is stated very briefly in the phrase 'Do or die'. It is action that counts in this world, at all events. In other words, life is the vital feature in this world, and action or doing, its chief expression.

Adaptability

But this directive power also plays its part in one of the outstanding and important facets of life, indeed of our very existence, both for the individual and the race; adaptability, or the capability of adjustment to changing circumstances.

In the milder changes, adaptability consists of behavioural adjustments as a rule, but in more serious changes actual structural adjustments may be necessary, and we have a legion of such examples throughout the range of natural history. In many of them the directive element in the adaptation is remarkable and a wonderful demonstration that structure follows the demand of function, and not the reverse, as the Darwinians profess. I shall only give one example; the egg-tooth of reptiles which tears an opening in the egg-shell to free the embryo, and then is promptly shed as it is of no further use.

In man it is especially interesting to see a new development, dependent on his increasingly intellectual progress, that he is able at times when his environment is not to his liking, to change it to suit himself, instead of adapting himself to it.

Another very interesting example of directive power is cytotocesis, intercellular calling or communication, in which a developing structure will influence directly adjacent cells to produce a structural change. Examples are the development of the deep and superficial parts of the eye and the precision union of the kidney tubules of nephritic and ureteric origin.

A further interesting point arises. It is that the living creature consistently produces from non-living material that which ultimately becomes part of the living structure. It constitutes the manufacture of replacements or spare parts which are incorporated. It is particularly striking in that, while we are totally unable to produce life voluntarily by any means, here we have another example of such power inherent in us, involuntarily going on quietly and continuously without any recognition and being taken for granted. This, to me, is the very essence of creation, its *sine qua non*.

The exhibition of directive power and organization permeates the whole of both pre- and postnatal life, and it outstrips imagination where necessary, both in the sphere of function and its resulting structure.

Memory as we experience it, is a function of the brain and in that respect is acquired, but there is a memory apart from this, closely allied to and not distinguished from instinct, innate and hereditary, and especially seen in the lower animals, e.g. insects, in the care and provision for their young-to-be, i.e. egg, grub, etc. It is comparable with the embryonic period of the higher animals.

Directive power and organization are inseparable. They are not synonyms, but the directive element is the power behind and controlling the organization. However, they form a unit and they function both in the involuntary sphere of instinct, and also in the voluntary one of intelligence as seen not only in man, though there most developed, but also in other animals in varying degree.

Coincident with life, we are endowed with a variety of qualities which are intimately bound up with it, and which constitute numerous potentials of graded importance, up to absolute necessity. They comprise latent possibilities, covering all our functional activities; indeed we might say that potential is 'function in prospect', and it is only when it is activated and put to work that we see its real value. In other words, *work* can be reduced to 'function in action'. It is a fair assessment to say that, while these potentials are allowed to remain in abeyance, they can be classed among the *futilia*, and it is only when they are activated that they come to fruition.

EVOLUTION

And now let us look at the question of Evolution.

Truth, as I have tried to teach, is the correct interpretation of evidence, and the more complete and factual the evidence is, as contrasted with what is incomplete and circumstantial, the more easily and likely we are to arrive at the right conclusion.

Consequently, when we raise the subject of evolution, we must have a clear mental picture of what it is we wish to consider. Indeed, unless the subject is clear to the speaker, he obviously cannot in turn make it clear to his audience.

What Is Evolution?

What, then, do we understand by Evolution? The word means 'turning out', 'unfurling', and, in this connection, we might ask 'what'? Comprehensively, it is the development and progress, *ab initio*, of the creation of the universe, including our world, a tiny part of it. For us, evolution, as I regard it, is an integral part of nature (creation), indeed an essential part. It has long been amazing to me that so much stress and importance has been placed on structure as opposed to function, which latter, again to me, is the *nucleus* of creation, the structure being simply the technical means of providing for its action. In other words, function is the horse and structure the cart, and this is the true status of priority.

So far as nature is concerned, its evolution is uncovered by the contemplation and meditation of the concrete evidence it presents, followed by its correct interpretation.

Our explanation of evolution must remain hypothetical, at least in part, until sufficient evidence is forthcoming to make it factual. So far, there is plenty of room for difference of opinion.

However, for our purpose we must restrict ourselves to our world as we know it, with our chief focus on man.

A further restrictive element must be taken into account in considering such a problem, and it is that we depend upon our intelligence, a very inconsistent commodity, for our assessment and judgement. One is reminded of the dictum, 'Knowledge is proud that it knows so much, Wisdom is humble that it knows no more', and this remains as true as ever.

It is, I think, generally accepted that in the beginning, life as we know it was not possible on the earth, as a prolonged period of cooling was first necessary — again in terms of our time.

In a rough general way, the Biblical description of the creation of our world, with time in prominent evidence, conforms very much to what we have elucidated so far, in that apparently the inanimate section was the first to appear some very considerable time before the animate, suggesting that the whole inanimate physical creation was a setting for the exhibition of life in all its ramifications.

Let me sum up then, what I consider to be the essentials of our being, our creation. Put in the briefest terms, they are: Life is the essence of our being, function the essence of life, activity the essence of function, with structure its pre-eminent accessory, organization the essence of activity, directivity the essence of organization, and finally, a director, the power behind directivity, who is the *quintessence* of it all, its Creator (one really ought to say 'sextescence', the sixth distillation).

Contrary to the opinion of the 'organic' evolutionists who have placed all the emphasis on structure as the primary consideration, in my view it is secondary to functional demand and subsidiary to it, and instituted as the technical means of carrying out whatever function may be involved. It therefore occupies a minor or secondary role in importance in the sphere of evolution. Function is the pre-eminently instigating basal factor. In nature we repeatedly meet with the exhibition of multiple structural ways and means of effecting the same end, a lesson for us to contemplate and copy; in other words, the functional demand is constant, the structural response variable. Nature abounds in variety, not basically in its principles, but in their execution.

Constituted as we are, structure has a great appeal as it is so readily appreciated by our senses, representing the materialization of a thought or conception and one of the commonest methods of thought transference, its object being to provide for the activation of functional demand.

Having already preached, and preached again, that for us the world as the supreme creation is the most wonderful objective teaching example we have or could imagine, it follows that evolution, dealing with one aspect of it only, is included in the teaching ensemble, its problem for diagnosis being the elucidation of the plan of its execution. Nature's examples are factual, and it is striking to see the teacher, in his function as their transmitter, ultimately becoming an example himself.

The Evidence at Our Disposal

Let us consider a few of the critical observations made by various protagonists of one or other theory as to what evidence we have to work on, and I think we shall see how uncertainly, even precariously, we are situated, and what scope there is for diversity of interpretation, and also for the influence of bias and speculation. These observations cover both fact and fancy and mostly weigh in against organic evolution.

The course of phylogeny is like picking up an interrupted trail, with the additional complication that the one we find is never quite like the one we left.

The concept of 'missing link' arises mostly from wishful thinking.

At one horizon in the rocks a particular organism is *not* there; a step forward in time and it is found showing full development (I stress the full development).

In the early Cambrian period, rare unmistakable traces were left in the rocks in the form of fossils. Before the end of the Cambrian, representatives of all the main divisions of the invertebrates were present, *fully* developed.

In evolution, the *general* appearance of types in sequence is factual, the rest is deductive and speculative. May I insert a needful reminder here? *Post hoc, ergo propter hoc* is a weak enough proposition in all conscience, but *post hoc, ergo ex hoc* is infinitely weaker still, though, perhaps, not foreign to the organic evolutionists.

No true intermediate link has ever been found between phyla.

In instance after instance we can trace an animal through the fossil record but we always arrive at a point where they are in existence and just beyond that there is nothing to be found.

In the two great phyla (invertebrates and vertebrates) development occurred independently of each other. The basal functional element is the same in both, but there is no likeness in the structural form—Wood-Jones.

Either there has been inheritance of acquired characters, or there has been no evolution—Herbert Spencer; Wood-Jones agrees.

The mosquito larva is modified to a special life, which is never followed by any ancestor.

A famous biologist has replaced the term 'modification' by 'mutation', which another equally famous man has criticized as an example of the specious verbalism in modern science, and this implies that it sounds wonderful and looks well but isn't substantial, indeed a juggling misuse or abuse of words. Derivatively, the words mean the same thing. Let us follow this up for a moment:

Modifications are somatic in origin and cannot be inherited. Mutations are germicidal in origin, and can be inherited.

So, if a modification is inherited, it must be a mutation.

But, it is conceded that a modification, after a number of generations, may be a mutation 'in the same direction' and so be inherited; in other words, the Darwinian has reverted to the older Lamarckian. Can I leave the implications to you, and is specious too mild a term?

A brief word on the embryo and embryonic life.

When the fertilized ovum has multiplied to 32 cells by apparently straight-forward division, it has been computed that to one cell only is allocated the task of forming the individual and the rest go to the formation of the structures necessary for embryonic development. Note the differential delegation of duties with the separation of their directive agencies to correspond. We may ask: 'What controls this delegation of specific duties?' Does chance appeal as the agent? Surely not!

But try to think of the destiny of the one isolated cell with its full inclusive potential: Here the outstanding differentiation that occurs is the separation of the reproductive from the somatic cells, the former as male and female having together the full potential of carrying on the race, while the latter have their circumscribed specific potential in the limited production of the great variety of organs and tissues, each, however, again with delegated duties specific to its purpose. Can chance be responsible? With such an elaborate plan, such perfect organization and such precision, can chance possibly enter into the picture?

Everything, too, is directive to the general exclusion of chance; there is no uniqueness in the occurrence.

The fate of the remaining 31 cells of the morula is not less striking and astonishing. Their comprehensive function is as over-all caretakers of the development of the embryo, which they carry out by the production of the whole gamut of the structures comprising the adnexa, and, when their function is completed by the birth of the embryo, they are cast away as of no further use, and no further use is made of them.

The discarding of the adnexa is not an isolated example of the fate of structures which have served their, often temporary, purpose, and many examples are available, such as the egg tooth or its equivalent, the respiratory apparatus of the tadpole, the temporary claw-like nails on the fore-hand of the newly-born marsupial, to mention a few. Wood-Jones (*loc.cit.*) has remarked, 'It is striking that no phylogenetic sequence underlies their independent development; there is no evidence in them of embryonic recapitulation of ancestral conditions, and they do not become so-called atavistic structures'.

This same programme is also carried out regularly in post-natal life, and he has further suggested that 'a law may be stated that change of habit, producing change of function, is the main cause of the production of change in living structure'.

The directive element in all these changes, whether pre- or postnatal, and the associated perfect organization, force themselves upon us. Chance again seems out of the race.

The organic evolutionists, obsessed with structure, which I repeat, is after all simply a technical response to a functional demand, have tended to avert the main attention from the essentially and primarily important feature of life, viz. function and its expression in activity, indeed, the origin of the demand for structure. Consequently, they have exalted the secondary effect at the expense of its primary

cause; in other words, they have placed the cart before the horse, and so reverse the true priorities.

On the contrary, my absolute belief in a creator as the originator and prime cause of the creation puts the wrangle of 'continuous progressive organic evolution *versus* truly creative evolution' in quite a different light, and reduces it pretty well to futility.

Accepting the omnipotence of the Creator with unlimited power, we must accept His unquestionable power to achieve and create anything He wishes, and so evolution from the amoeba to man could be achieved in *either* way, should He so decide, or even by the two combined.

On the one hand, organic evolution without a Creator, utterly fails to establish any complete, continuous, straight-forward development of phyla and genera from one to the other, there are so many exceptions and blanks; but, on the other hand, how frequently and readily the gaps in the sequence could be satisfactorily explained by a new creation, *which, indeed, would offer no problem that hadn't already been met in the primary creation.*

However, I feel that this controversy has unjustifiably occupied the stage too long, its importance exaggerated altogether excessively, and I have no doubt that, as time goes on, we shall be able to ferret out the factual evidence that will settle it, naturally I believe, in favour of creation and its Creator.

The Emergence of Intellect

For me, the most important item in evolution, used in its inclusive sense, is the emergence and development of intellect with its product intelligence, seen at its best in man, which has demanded the increasing development of the brain, and I believe that this is still proceeding and is likely to continue. It, or what may seem to be it, we even see in the amoeba, where it may not be impossible that some of the activity we have attributed to instinct may, in fact, be controlled by the rudiments of intelligence. It strongly supports Wordsworth's sentiment: 'It is my faith that every flower that blows, enjoys the air it breathes', as well as Wood-Jones's: 'Who knows? Perhaps there can be no life, animal or vegetable, unaccompanied by consciousness', both of which suggest the power of discrimination.

It is a far reach from the amoeba, with its behaviour and activities suggestive of nervous control, and without anything resembling a nervous system, to the amazing development of the brain of man.

We are all familiar with the development of a nervous system, with its centralization, ventrally in the invertebrates, dorsally in the vertebrates, and its peripheral network, bringing it into relationship with environmental conditions, internal and external. In the vertebrates in particular we see the remarkable progress from the spinal cord to the hind-, mid-, and fore-brain as intellectual advancement takes place, with the final concentration of it in man to the cerebral hemispheres of the forebrain, and we are gradually and successfully elucidating the detailed distribution of function in them.

The brain, of course, is the progressive structural response to the functional demand of intellect as it proceeds on an ascending scale from the suggestive rudiments in the amoeba to the full-scale development in man. The detailed cellular structure is essentially the all-important change that takes place, the size of the brain, like so many other body structures, being of less consequence than its quality, and only of note so long as the standard of quality is maintained or improved.

According to the best estimates we are capable of so far, man, or what we have been prepared to accept as man, has only been present in the world for the last two and a half million years or so, a very recent appearance when compared with geological time, and it is unfortunate that we have so little record of his early presence, and none at all of the detailed structure of his brain. His intellectual level was extremely low and remained so up to and through the Stone Age to its merging with the Bronze Age, which appears to have begun about 5000 years BC. I doubt very much

whether we are justified in calling man *Homo sapiens* much before 5 000 BC. He has sometimes been dubbed *Homo faber* for some time before that, when he began to make some sort of tools, which can only be regarded as the very thin edge of the wedge. As we know, the use of tools or their equivalent is not limited to man.

I am convinced that something of a very radical nature occurred to the intellectual development of man about this time, i.e. 5 000 years BC or so, and chiefly developed in the 4th millennium.

What has struck me was the relatively sudden tremendous increase of intellectual capacity of which records began to appear, and it was apparently not limited to one area.

Nineveh, Assyria, on the Tigris in Upper Mesopotamia, seems a good starting point. From excavations, Nineveh appears to have existed from about 10 000 years to 612 BC when it was destroyed. In the early part there were only living conditions and cultivation of the land of the most primitive type, but long before its destruction its people were living in magnificent palaces. There is as yet no actual evidence of replacement of human stock, as in other regions, which may suggest possible originals there.

Roughly in the latter part of the 4th millennium BC, we note the presence of an advanced civilization, already well developed, in China, India, Egypt, and Crete (Minoan), associated in the last three with an influx of a new type of man, suggestively from the region of Mesopotamia.

In this connection, too, I think the work of Professor W. B. Emery in Egypt of the greatest significance and importance. The following quotations are from his book, *Archaic Egypt* (1961):

'At a period approximately 3 400 years BC a great change took place in Egypt, and the country passed rapidly from a state of advanced neolithic culture with a complex tribal character to two well-organized monarchies, one comprising the Delta area, and the other the Nile Valley proper. At the same time the art of writing appears, monumental architecture and the arts developed to an astonishing degree, and all the evidence points to the existence of a well organized and even luxurious civilization. All this was achieved within a comparatively short period of time, for there appears to be little or no background to these fundamental developments in writing and architecture.'

'Authorities are divided in their opinions as to the reasons for this sudden cultural advance, but it would seem probable that the principal cause was the incursion of a new people into the Nile Valley who brought it with them . . . The balance of evidence strongly suggests that it was a 'horde' invasion rather than a gradual infiltration. Further evidence points to Mesopotamia as their origin. At any rate, towards the close of the fourth millennium BC, we find the people known traditionally as the 'Followers of Horus' apparently forming a civilized aristocracy or master race ruling over the whole of Egypt. This is supported by the discovery that graves of the late pre-dynastic period in the northern part of Upper Egypt were found to contain the anatomical remains of a people whose skulls were of greater size and whose bodies were larger than those of the natives, the difference being so marked that any suggestion that these people derived from the earlier stock is impossible.'

'Many similarities in their cultures point unmistakably to a connection with contemporary cultures in Mesopotamia.'

'We find that at the dawn of the historic period Egypt was divided into two kingdoms of the North and the South, both ruled by a royal house and aristocracy of the same race, and both known traditionally as the "Followers of Horus", the demigods of the period.'

This invasion corresponds closely with that in the Island of Crete, already quoted as occurring some centuries before 3 000 BC, which was populated by men of non-Indo-European stock, possibly coming from south-west Asia Minor, who introduced the brilliant Minoan civilization.

In this connection, too, it is especially interesting, and I think significant, that Abraham, the progenitor of the Jewish race and an exceptionally remarkable man, emigrated from Ur of the Chaldees, in Mesopotamia, about 2 000 BC, apparently of this same stock, and accredited as the first man to recognize the power behind nature and to introduce Mono-

theism. It may not be without some inspirational significance that the 'Garden of Eden' (? 4 000 BC+) was reputedly situated in this same Mesopotamian region, and so it may be that, traditionally, Adam and Eve really typify the progenitors of this race of 'supermen', the true '*Homo sapiens*', with his freedom of will and appreciation of good and evil, accompanying his realization of the Creator as the 'one and only God', a 'personality' with whom Adam is stated to have spoken. This might and could even forestall Abraham's claim of priority in this connection.

Coupled with the development of Nineveh from primitive land cultivation in the tenth millennium BC to full stature in contemporary civilization long before its (Nineveh's) destruction, I feel that we are justified in accepting the Mesopotamian strip as the region from which came what has been called the master race of the period.

I feel that, if there can be a first priority in the realm of interpretation of Evolution, this upsurge of intelligence is it, and the question that presents itself is 'how are we to assess it?'

We have to recognize that, for roughly 98% of the two and a half million years of man's so far accepted presence on the earth, very little progress was made in the sphere of intelligence, up to and including the Stone Age, and then, relatively suddenly, out of the blue comes a revelation, 'the appearance of supermen (of the period) with no preliminary introduction, and not only one or two but a horde'. How are we to interpret it?

I suppose, if one wished to invoke the advocates of organic evolution, one would have to fall back upon it as an example of so-called 'explosive' evolution, a term vague and indeterminate and offering no real explanation, but appearing as evasive rather than elucidative, in fact, an example of the specious variety. At all events, in their judgement no doubt 'ubiquitous chance would have been very prominent, possibly with some reshuffle of genes'.

On the other hand, if we turn to creative evolution, always keeping in mind the unlimited power of the Creator, two possibilities are offered; either, first, a regional gift of increased potential, relative to intellect, involving the necessary structural brain developments to produce it, one more example of directive activity; or, secondly, the creation of a new breed of man. Having accepted the omnipotence of the Creator, there is nothing impossible in either programme, though my leaning is towards the former. It is worth remembering, however, that the origin of these hordes of supermen was unknown to the countries they invaded, that they were different from those already in occupation and that they were looked upon as demigods by the original natives. It is at least suggestive of the second possibility.

It may also not be without significance that Adam's sons apparently found their wives outside the Garden of Eden, favouring the first possibility. It indicates the presence of pre-Adamic man, or at all events, that there were others outside the Garden, and contemporary.

Looking at the picture of Evolution, so far as we have progressed, it would certainly appear that the underlying ultimate aim of Creation was the development of intellect, its peak being attained in man. I am convinced that the purpose of this was that we should be able, *by our own endeavour*, through our intelligence, the product of intellect, to unfathom the whole problem of creation and its evolution, in all its intricacies, so as to lead us to the fullest possible comprehension of its Creator Himself; in other words, as I have repeatedly insisted, we are furnished with the most perfect teaching demonstration imaginable and it is up to us to diagnose and interpret it correctly.

Intelligence, however, is not simply thought, but the outcome of intellect, a potential of prime importance, with voluntary directive power, carrying with it the capacity to analyse, criticize and assess thought, and finally to apply it directive. It is psychic, subject to consciousness, the waking state of the mind, the faculty by which we think, although the organ responsible, the brain, is somatic in origin; but, in common with others, the brain, as an organ, is produced as the means of achieving a functional need and is the vector of its products, whether they be internal or external, secretory or excretory.

I am not by any means alone in believing that the future of evolution lies in the sphere of the non-material, in the psychic rather than the somatic, which latterly has held the field so strongly; in other words, that the upsurge of intellect has by no means reached its zenith, and that the mind will continue to take precedence increasingly over the material side of our lives, and so gradually approach a more and more complete understanding and appreciation of the infinite power behind creation, and indeed of its Creator Himself.

TEACHING AND NATURE

I have made several allusions to teaching while discussing nature and its evolution, and let me emphasize once again that I regard them both, complementary parts of one whole, as having been produced for our benefit, not in the sense of spoon-feeding, but for our contemplation, meditation, and elucidation, i.e. by our labour.

We, as part of this creation, have been endowed with intelligence for this purpose, and, carried to its proper conclusion, it amounts to this. Our world, as a small part of creation, with us included, is a finite concrete production, essentially 'worldly', in our sense of the word, and represents the material realization of a concept, as we would put it, as a thought materialized in order that it may be passed on to us, in a form that is readily appreciated and understood by our senses and intelligence.

We are taught everything in life by our meditation of Nature, our World. To me, this is the answer to the question we readily ask, 'Why the creation of nature, and what is its purpose?' It is to teach us, progressively, at the expense of our labour (as Leonardo says), something of the workings of the infinite, so that we get increasing understanding of it. We might express it in this way: 'Nature, with its evolution, presents to us an evolving (unfurling) picture of a finite project, which leads to our comprehension of the infinite, but which requires our patient persevering labour for its attainment.' Remember the bottled specimen—surgical pathology offers, in a small way, an example of the same teaching, the elucidation of the clinical picture from a study of the specimen.

CONCLUSION

What, then, have I tried to put over to you? Let me endeavour to express it as succinctly as possible. It is a personal view, shared by many others, though perhaps not voiced in the same terms but, actually, among our scientific confrères certainly the opinion of the minority. Any repetition I may be guilty of is essentially for emphasis.

The whole of nature and its evolution result from the materialization of its Creator's concept, essentially for our benefit. It is a prospecting and testing ground for us, with all the aids there for us to find and use, if we will only make the effort. It is the materialization of a non-material concept, a production of the finite from the infinite, the perfect example for us

of the Creator's work, complete in every detail, with perfect organization, the most marvellous 'going concern' in existence, furnished with delegated automation in essentials, self-governing guiding power, and, in great measure, self control, both innate and acquired. Moreover, its functioning is continuous and this includes its normal operating or working, repairs, improvements, replacements, and even possible new models at times. At the same time the Central Controlling Power is always there if needed and never far away. In other words, we are presented with a cosmos in place of a chaos, every feature in its constitution the very antithesis of those in the make-up of chance. Indeed, if there is such a thing as chance, my belief is that man himself is responsible for it, through his, as yet, imperfect and incomplete evolution, with ignorance playing the most prominent part.

Here we have a technical achievement, which consists of a programme of progressive development towards its highest objective, man, and he has been furnished with the intelligence, again of a progressive character, to analyse and elucidate it fully, thereby learning more and more of the secrets and workings of the power behind the creation, which is infinite and immeasurable.

Man's investigation of nature, the creation, is aided by the example he has to look at being concrete and finite, acceptable to him as wholly appreciable by the senses he is endowed with, everything involved, nature itself, ourselves, and our intellect, being part of the worldly set-up, and therefore mutually susceptible.

There are two points I would like to emphasize. The first is that, in my opinion, man's future evolution revolves round his progressive intellectual improvement, which will involve further betterment in the calibre of his brain, and we could, I think justifiably, anticipate a growing movement from the materialistic towards the non-material, the realm of thought and the spirit, with 'organic evolution', obsessed as its advocates are with the idea of the primary importance of structure, being relegated to its secondary position as the tool of function.

The second is that I am convinced that the Creator, with His unlimited and illimitable power, is an absolute *sine qua non*, as, in the presence of omnipotence, chance and impossibility are equally excluded, while the wrangles and differences of opinion and interpretation of us imperfect humans are reduced to their proper perspective of relative pettiness and unimportance. In fact, the real aim, the truth, is very liable to be obscured or even forgotten in such a wrangling, as personal pride and self-esteem, the elements of self-conceit, are so prone to enter and claim attention overwhelmingly.

Finally, a last thought . . . the evolution of man's attitude towards the forces exhibited in nature.

Primitive man worshipped them all as gods, all in fear, and whether good or evil, the former in case they didn't appear, and the latter in case they did. They insured themselves both ways.

This attitude still predominated at the beginning of the upsurge of intelligence in the fifth and fourth millennia, and even persisted after the recognition of the Power behind Nature as the one and only God, but with a gradual admixture of unselfish extrovert affection developing towards its Creator.