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Nature Green in Cell and Leaf

(Revised Edition 1994)

John Barnes

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Prelude: Physicists and Poets

In 1656 a boy was taken from Grantham Grammar School to assist his widowed mother on the family farm. But this move was not a success - the boy occupied himself with mathematics instead of farm work. Within thirteen years he was Lucasian Professor of Mathematics at Cambridge, and absorbed in the spate of ideas and discoveries about his universe which made him one of the greatest scientists of all time. In late life, Newton was to sum up his career in the famous remark: "to myself I seem to have been only a boy playing on the seashore and diverting myself now and then by finding a smoother pebble or prettier shell than ordinary, while the great ocean of truth lay all undiscovered before me."

More than three centuries later, Stephen Hawking holds the same Chair in Mathematics at Cambridge. Our knowledge of the world is now vastly greater than was Newton's, but the same ocean of truth stretches out before us in even greater mystery. Hawking ends his best-selling *A Brief History of Time* with thoughts not entirely dissimilar in tone from those of Newton, despite the confidence given by the centuries of cumulative discoveries: "if we do discover a complete theory (of the universe) ... we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of the question of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason - for then we would know the mind of God."

Each in his own style, Newton and Hawking - with a thousand other seekers - are at home in the majesty and coherence of the universe. In common with his contemporaries, Newton had no doubt whatever about the creative and sustaining power of God: Hawking is agnostic, but treats the universe as a dignified mystery proclaimed by the lucidity and faithfulness of the laws which - amazingly - man seems able to resonate with.

In this attitude of respect, even semi-reverence, such scientists today continue a traditional link-up with mystics and poets. Many would, in some form, echo the Psalmist's ancient question:

"When I look up at thy heavens, the work of thy fingers, the moon and the stars set in their place by thee, what is man that thou shouldst remember him, mortal man, that thou shouldst care for him?"¹

The growing number of scientists persuaded that the universe seems designed to produce life and mind, might echo Tagore's "The steps that I heard in my playroom are the same that are echoing from star to star."

The New Neo-Darwinists

In contrast, very different declarations are made by our modern determinists, mainly in biology. Richard Dawkins, encouraged by recent discoveries in genetics, asserts that:

"Natural selection, the blind, unconscious automatic process which Darwin discovered ... has no purpose in mind ... it has no vision, no foresight ... We are nothing more than DNA's mistakes. We are lumbering robots containing genes that control us body and soul mind."
"God is a deeply untidy frill." ²

Even Jacques Monod's fine book *Chance and Necessity* includes remarks such as:

"Man knows at last that he is alone in the indifferent immensity of the universe, whence he has emerged by chance. His duty, like his fate, is written nowhere ... there is no plan, no intention, in the universe. Man, like a gypsy, lives on the boundary of an alien world, deaf to his music ... indifferent to his hopes ..." And, undergirding Monod's chilling vision:
"Chance alone is at the source of every innovation, of all creation ..." ³

Monod's recent death has robbed the world of a brilliant scientist, joint winner of the Nobel Prize for his share in deciphering the genetic code in DNA. But his challenging book continues to be widely read, so that we may take it that his views will persist alongside those of Richard Dawkins, and others like Peter Atkins - a physical chemist - who says:

"... everything is extraordinarily simple. Once molecules have learned to compete and to create other molecules in their own image, elephants and things resembling elephants will in due course be found roaming the countryside." ⁴

Television's 'Red in Tooth and Claw'

In parallel with the dismissive declarations of determinist scientists like Monod, Dawkins and Atkins, we are now experiencing a media development which can reinforce those views. Amongst the most popular television series are the *Nature* programmes, put on by all the main channels at peak periods for family viewing. The normal television technique is designed to prevent our 'tiny' minds from looking elsewhere; thus, sooner rather than later, there is a peak-attention event. For a humorous programme, the aim is a laugh a minute

- for *Nature* programmes there is the chase and, usually, death, involving lion, tiger, crocodile or snake.

The excellence of modern camera work has the extraordinary result that millions of people armchaired at home can see more of the bloody death of a stag than do the hunt followers themselves. If one is thus absorbed, one may not notice the other factor in the equation - the rhythmic music reaching its own climax with the predator's final leap. The chase of new-born vulnerabilities, the anguish of the mother animal unable to defend its youngster, the tearing to pieces of a once-graceful deer; these are all part of our vivid, domestic existence.

Admittedly, commentators like David Attenborough will explain that on average a lion only succeeds once in five chases; but the image of that final predatorial triumph will normally overlay the memory of the fruitless chases. Thus, the death of the few - sometimes carefully arranged for the cameras - can blot out the peaceful progress of, say, the herbivore's undramatic day. Those hours of leisure, grooming feathers or fur, dozing among their peers, being at ease in their own milieu: these are of deep importance in the life of all creatures. But how boring, if competing with the next batch of advertisements, or the split-second timing of the next BBC programme!

A moment's non-visual thought would put predation in its place, as one considers the vast communities of wildebeest or caribou - small occasional groups of lion or wolf are marginal to what are hugely successful nations of non-predatory animals: for instance, wildebeest numbers in that spectacular migration in Central Africa have multiplied in recent decades. But the bloodied death pangs on television have power to deny the positives of the creaturely world.

Does this matter? May we not, as people experienced in both the light and dark sides of life, mentally shrug shoulders, in that television - good or bad - is here to stay, and we must get used to its less benign aspects? To do so, however, would be to ignore the distress felt by large numbers of people who may well be relaxed in delight at some countryside picture a moment before the menace arises in the predator's prowl (and musical accompaniment, so often). It is surely almost certain that the general effect is a growing indifference to suffering, which becomes 'just one of those things'.

More especially, the effects on children should be a major concern. Their innate love for vulnerable creatures can be eroded to the point where they will absorb as normal the dwelt-on-by-TV death in the life of a creaturely group. Indeed, among the sharpest child watchers, may there not be an unnoticed slow building up of potential tension, available for unpremeditated release in some moment of internal crisis? How many apparently purposeless crimes have already occurred with this at least a partial cause?

Tennyson's True Vision

It is ironic that the powerful phrase 'Nature red in tooth and claw' should have been plucked out of context in Tennyson's major poem - of which many people will know nothing else. Tennyson wrote *In Memoriam*⁵ over a period of years when deeply depressed over the death of his close friend Arthur Hallam. Allowing for the mid-Victorian flourishes, the poem as a whole is a moving tribute to the poet's sensitivity. It has a totally different orientation from the one notorious phrase, even in the two verses containing it:

... and he, shall he,

*Who trusted God was love indeed
and love Creation's final law -
tho' Nature, red in tooth and claw
with ravine, shrieked against his creed -*

*who loved, who suffered countless ills,
who battled for the True, the Just,
be blown about the desert dust,
or sealed within the iron hills?*

In the prologue, written after the main poem, Tennyson puts the perspective which underpinned him for the rest of his life:

*Thou wilt not leave us in the dust:
thou madest man, he knows not why,
he thinks he was not made to die;
and thou hast made him: thou art just.*

The final verse of the entire poem would surely be a better monument to Tennyson than that one atypical phrase:

*That God, which ever lives and loves,
one God, one law, one element,
and one far-off divine event
to which the whole Creation moves.*

The Power of the New Knowledge

There has been in our lifetime a truly great achievement of the human mind in that we have begun to elucidate the structure and role of the vast DNA molecule. This contains the detailed code for any organism - plant or animal - and can have a million or more 'bases', small chemical units which carry the instructions to make from particles the large numbers of proteins which cells use to make new ones. In the case of some of the early single-celled creatures - corals and algae for example - there has been no known change over the billions of years, the sheer faithfulness of the DNA transcription being remarkable.

In most organisms, however, mutations in the DNA molecule can occur on an apparently random basis. There are usually minor step-by-step changes, each of which in the modified organism has to stand the test of environment and internal cohesion. In many cases such new modifications will fail, as the fossil record attests. But where a long series of adaptations prove viable - perhaps over great numbers of years - a new species might appear. Its success can be the result of a greater ability to flourish as compared with other (unimproved) organisms of the same general species.

As with any period of rapid advances in knowledge, the elucidation of the genetic code is exciting. The developments are of immense importance both to our understanding of living processes, and to further advances now imminent - like the plotting of the entire human DNA ('the genome') which has begun and may take years more. No one doubts that life as we see it, and are part of, is the result of what Sir Alister Hardy calls "the prodigious forward surge of organic growth and reproduction over billions of years".⁶ No one doubts that the process will continue into the far future - with or without us humans ...

Darwin's Unwanted Bulldog

One of the understandable effects of the publication of Darwin's *The Origin of Species* in 1859 was an explosion of enthusiasm among liberals and scientists who were already aware of the growing evidence for some kind of evolutionary ladder of life. Enthusiastic disciples often outrun their teachers, of course. It was not long before T.H.Huxley, appointing himself as 'Darwin's Bulldog', defended Darwin and his book by assertions such as: Natural Selection meant "a war of each against all: a terrible Hobbesian struggle for existence: and life as a gladiatorial combat". Huxley and his fellow Darwinians picked up from

Herbert Spencer the fatal Tennysonian phrase - ignoring, as we have seen, the many fine expressions of a diametrically opposite belief in the poem.

Perhaps the most damning downgrading of humanity I know is Huxley's: "mind is just the whistle of the steam train". This is, of course, past history, but when scientists like Dawkins with his "the only watchmaker in nature is the blind forces of physics" proves himself a true acolyte of Huxley, we have to ask what Darwin, a cautious man, actually said and felt at different periods of his hardworking life. Before coming to Charles Darwin and Alfred Wallace, Darwin's confidante and fellow-discoverer of Natural Selection, a few timely words from Ogden Nash might provide a natural break:

Ogden Nash, Huxley et al

*Though man created cross-town traffic,
The Daily Mirror, News and Graphic,
The pastoral fight and fighting pastor,
And Queen Marie and Mary Astor,
He hails himself with drum and fife
And bullies lower forms of life.*

*Not that I think that much depends
On how we treat our feathered friends,
Or hold the wrinkled elephant
A nobler creature than my aunt.
It's simply that I'm sure I can
get on without my fellow man.*

(from *A Bas Ben Adhem*)⁸

What did Darwin Say?

As I have noted, there were growing speculations about some form of evolutionary progress before Darwin. In fact a number of distinguished writers had put their names to speculations turning gradually into formal theories, seeking to explain both the vast variety of living forms and the growing knowledge of the geological record. In this century, Bernard Shaw⁹, articulate exponent of Bergson's Life Force, set out the sequence of important pre-Darwinians feeling their way towards formal evolution as:

George-Louis Buffon (1707-1788: "a better evolutionist than Darwin or Wallace");

Carolus Linnaeus (1707-1778);

Johann Goethe (1749-1832);

Jean Lamarck (1744-1829);

Erasmus Darwin (1731-1802: grandfather of Charles).

All of these helped to pave the way for Darwin and Wallace. Lamarck deserves special note: although his ideas included the generally rejected theory, 'the inheritance of acquired characteristics', his assertion most relevant to us seems to have been that living organisms strive upwards, willing themselves into more complex form. As Dawkins points out, there is a mystical element here which he and others condemn, but which many people still see as a hidden element in the still-uncompleted Darwinian theory of Natural Selection working through variations.

What Darwin first saw clearly during his famous study voyage in H.M.S. Beagle was the power of adaptation, whereby living forms could respond to their situation by a series of small but useful changes, like the shape of birds' beaks. He noted that groups of the same birds, isolated on different islands, had developed very different shapes, each seemingly viable in different milieu. Darwin extrapolated from this ability of birds to change beak shape advantageously, to the wider world, where his studies produced many confirmations of what he concluded was a natural law. Darwin was a methodical and determined researcher and, despite a debility haunting him for much of his life, he amassed data on a vast array of organic change, from Galapagos tortoises to the nearby breeders of pigeons and farm animals in Kent.

Darwin's shaping of his material is thought to have been much influenced by Malthus' *Essay on the Principle of Population*, which was widely read and stimulated debate on its theme that unrestricted populations would always outgrow available food, with the result that life is often competitive.

As Leonard Huxley¹⁰ pointed out in his life of Darwin, there were four outlines for *The Origin of Species* before Charles came to finalise his firm structure for the book. This uncertainty, together with the slow accumulation of data over some two decades, underlines Darwin's patience and caution. Thus, he could keep an open mind on some aspects while believing strongly in evolution's principal basis as he had elucidated it. Darwin's openness was illustrated by the way in which he consulted the famous anti-evolutionary, Gosse, in mutual botanical interests, despite the intensity of feeling on both sides once *The Origin of Species* was published in 1859.

It was while Darwin was writing a précis of *The Origin of Species* that he received from Alfred Wallace - then in South East Asia - some twenty scribbled pages written whilst he was marooned indoors during a monsoon storm. The slight packet reduced Darwin to momentary despair, exclaiming that all his work was thus undone; for the Wallace scribble outlined a theory strikingly like Darwin's own. Wallace's return to England in 1862 led to a friendship which - given their different views about some aspects of the theory and its significance - was maintained reasonably well throughout the rest of Darwin's life. The seminal book might well have been published under their joint names, but the massive research done by Darwin over the years led Wallace, generously, to stand down.

In his recent life of Darwin, John Bowlby reports the significant response of Darwin to misunderstandings arising from his use of the term 'Natural Selection' in the book. Within a year he was regretting not having substituted 'Natural Preservation'. By then it was too late - the phrase had won a life of its own - although Wallace never ceased to be worried by the misunderstanding; as late as July 1866 he was pleading with Darwin to make the change.¹¹

Doubts about Darwinism

One vital factor in Darwin's approach is important: he did not claim a full explanation of the way the natural world had developed. In essence, he described the process (selection plus variation) whereby changes, each on a small scale, could occur randomly over long periods of time. Each would need to be tested within the organism's environment, as well as in terms of the living organism. Many such changes would fail, and the organism might be lost as a result. But many such successful changes *could* bring about a new species. The changed features would have been tested at each successive stage and, similarly, the viability of the species would be tested in the future.

But Darwin also wrote of "the many objections which may be urged against my theory". He looked forward to "a grand and almost untrodden field of enquiry". But, it seems, that untrodden ground was rocky with the acrimony aroused by *The Origin of Species*, and as has happened in similar cases elsewhere, the points at issue have been dealt with sporadically, with no overriding strategy. Thus, one of the really fundamental criticisms has never been properly evaluated, namely: the way in which the remarkably complex processes of living organisms actually began.

Secondly, Darwin's claim that changes occur under the pressures to survive does not explain the fact that - as Monad pointed out - many developments occur without competition. John Fisher describes in his *The Origin of Garden Plants* the Jurassic period witnessing. "the sudden unheralded appearance of flowering plants with a structure totally different from what had gone before."¹² Fisher adds an illuminating comment which Darwin made to Joseph Hooker in 1881: "Nothing is more extraordinary in the history of the vegetable kingdom than the apparently very sudden and abrupt development of the higher plants".

A further aspect of this same order of problem lies in the numerous cases where development reached beyond what might be expected in theory. Most interestingly, the human brain seems to have increased greatly in size and capacity about a million years ago. From a modern perspective this change is puzzling since it occurred without commensurate pressure from rivals or environment.

There are other problems with the theory which cannot be dealt with here; but there is one that should be mentioned - the development from simple to complex structures. Why would this happen? If all things are random, why would there be 'progress' at all? Where complexity requires sensitivity, how would a new delicate level of life be both attained and sustained? These are questions which Lamarck sought to answer by asserting that the organism sought to lift itself; for instance, the eye came about because creatures, at some level, willed it. Lamarck, subsequently derided, may soon be making a comeback.

Charles Darwin and Alfred Wallace

Some of these criticisms were voiced by Alfred Wallace in the early days of his association with Darwin. Wallace had, indeed, written of "an intense impression of the beauty, harmony and variety in nature"¹³. He saw humanity as part of a progressive world governed by truly inclusive natural law, namely one which allowed for the non-material area of life, leading up to fully spiritual powers and beings. In this context, Natural Selection was the environment preserving the good already in being against developing organisms unable to maintain themselves, while the genuinely better changes could, over time, be made. All this would occur within groups whose co-operation fitted them to survive challenges from the environment and, at times, from other groups. Internal conflict would be minimised for the well-being of the group. As social

organisation strengthened, the moral qualities were "honed to perfection by Natural Selection and by cooperation" ¹³.

Wallace "plucked mankind's consciousness from the realm of Selection altogether; savages had a mental capacity far beyond their needs ... Selection could not have given it to them, but spiritual forces could." While living with Dyaks in Borneo, Wallace said: "The more I see of uncivilised people, the better I think of human nature." ¹³

It was Wallace's spirit-driven evolution that worried Darwin. Wallace was "revamping evolution to take account of ... a higher spiritual reality." But, perhaps under Wallace's influence, Darwin wrote to Graham, author of *The Creed of Science*, saying that he was "swayed by Graham's inward conviction that the universe is not the result of chance." After the theme of *The Origin of Species* had been taken up in bulldog fashion by supporters like Huxley, Darwin confessed himself walking "on eggshells," aware of people "taking his views to a greater length than seems to me safe." He met criticisms with amendments to the fifth edition of *The Origin of Species* - including allowing that the environment could cause a greater number of useful variations to appear. He also accepted the Lamarckian idea that greater use of an organ can cause growth which might be handed on by inheritance.

Darwin and God

Did Darwin find purpose in the world of nature? In his brief autobiography of 1876 Darwin gives an endearingly honest account of the development of his thought about possible Divine activity. Quoting the Journal he wrote while serving on The Beagle (1831-6) he recalls his "feeling of sublimity when standing in the grandeur of the Brazilian forest". Twenty-five years later his sense of God had moved, as he put it, from feelings to reason. His position then was "the impossibility of conceiving this immense and wonderful universe (to be) the result of blind chance ... I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a Theist". By the time he wrote his little *Autobiography* ¹⁴ at the age of 67, Darwin's mind had come to rest in "the mystery at the beginning of all things". As Bernard Shaw pointed out in the Preface to *Back to Methuselah* already mentioned, Darwin was so little preoccupied with theological speculation that "he never quarrelled with the theistic Unitarianism into which he was born."

Peter Kropotkin: Natural Selection and Mutual Aid

One of the by-products of the first publication of *The Origin of Species* in 1859 was its effect on a remarkable Russian geographer and naturalist, Peter Kropotkin. Born into the highest aristocracy, the young Kropotkin turned his back on a Court career, trained as a scientist and set out - as he tells us himself - eager to corroborate Darwin's thesis in Siberia. What he found was much more complex, paralleling the implicit doubts about Natural Selection which Wallace had voiced from his experience in South East Asia.

The Siberia which Kropotkin explored was virtually free from human and industrial pressures. The Natural Selection process which he studied was diametrically different from the violent extermination suggested as an important part of the process by Darwin and - especially - by his zealous followers. The norm Kropotkin described included:

"New varieties of animal consist, in an immense number of cases ... in forming new habits, moving to new abodes, taking new sources of food. In all such cases there will be no extermination, even no competition ... yet there will be survival of those best fitted for the new conditions as surely as under the hypothesis of extermination." ¹⁵

Kropotkin's wealth of examples - both of humans and of animals - are still well worth reading for their elegant insights into true creatureliness. He stresses that where there is a struggle for survival, as during exceptional drought or other crisis, the survivors are not necessarily the best able to perpetuate the species in question. "If Natural Selection depended on this sort of process, regression would be the rule ... happily enough, competition is not the rule, either in the animal world or with mankind. It is limited to exceptional periods, and Natural Selection (normally) has better fields for its activities. The watchword comes to us from all living systems: combine - practise mutual aid. That is the surest means for giving to each and all the greatest safety, the best guarantee of existence and progress - bodily, intellectually and morally." ¹⁵

Kropotkin argues that Natural Selection could not be effective without a long period of strong social adhesion. Only thus, for example, could the young have the security and training essential in the altered circumstances of the modified species. A new normality would have to be established long enough to give the stability of the group, within which fully mature creatures would be ready to continue the modified species in the future. Kropotkin is particularly emphatic about the value of creaturely enjoyment - the youngsters

in their exploring groups, or the parents relaxing with their families. Darwin presumably had this point well in mind, in commenting that "all sentient beings have been formed so as to enjoy as a rule happiness".¹⁶

If the word 'happiness' seems too upbeat a gloss on 'contentment', we can appreciate what Kropotkin meant if we accept that the consolidation of adaptations could never be achieved in crisis situations. A pitiable example being enacted now in parts of Africa is the state of mind of elephant groups where the males have been killed for their ivory. Observers report paranoia within the stricken group, with the old normalcies replaced by panic out-of-character actions.

Kropotkin's work as scientist in Siberia was followed by years of dangerous service for the International Working Men's Association (The First International). As an anarchist, he was hunted and imprisoned in three European countries before finding refuge in Britain. He was led to crystallise his ideas of *Mutual Aid* as a corrective to what he saw as T.H.Huxley's exaggeration of Darwin's ideas, published in *The Nineteenth Century* in February 1888. Kropotkin's essays followed those of Huxley in the same respectable journal, and appeared in book form as *Mutual Aid: A Factor of Evolution* in 1902.

He was never insulated from the evils suffered by innocent beings - human or not. He returned to his beloved Russia at its time of terrible civil war. Still his own man, we know of his letters to Lenin criticising the suspension of human rights under the stress of war. Never losing faith in *Mutual Aid*, he was writing a book on Ethics when he died at 79. Until justice is done to this great character, we might treasure Bernard Shaw's description: "He was amiable to the point of saintliness, and with his full red beard and loveable expression might have been a shepherd from the Delectable Mountains."¹⁷

John Ruskin was expressing similar ideas to those of Kropotkin when he wrote:

"The power which causes the several portions of the plant to help each other, we call life. Much more is this so in an animal ... Thus, intensity of life is also intensity of helpfulness - completeness of depending of each part on all the rest. The ceasing of this help is what we call corruption; and in proportion to the perfectness of the help, is the dreadfulness of the loss."¹⁸

Since Kropotkin

Since the deaths of Wallace in 1913 and Kropotkin in 1921, their insights have been underlined in many area of research into the extraordinary processes

embodying the living world. We now have a plausible scenario for early forms of life developing over billions of years. After doubtless many experiments in coming together, early forms of bacteria co-operated to build primitive cells. There is no doubt that the early primitive cells gained in complexity over the millennia. Each cell is now a tiny universe of ceaseless co-operative activity, assembling the protein molecules essential for all life processes. The replication of every cell in every life form depends absolutely on the giant DNA molecule carrying the detailed pattern of the complete organism within each cell.

The simplest modern cell has the DNA code to guide the synthesis of about 750 *different* proteins the cell needs to ensure the healthy functioning both of cell and organism. A typical animal cell may contain some ten thousand million proteins, of about ten thousand different kinds and functions. Figures tend to become meaningless when we are told, for example, that a human's brain and nerve cells (neurones) may number some ten thousand million; and that the intricate connections between them in one human brain are "far more numerous than there are positive particles in the whole universe". With numbers of this numbing order, we are a little blasé, perhaps, in accepting the figure of 220,000 cells per minute created in the human embryo for the whole time of pregnancy apart from the first three days. Every one of those new cells has the complete DNA pattern for the new human in course of being formed; and every cell seems to know its allotted place in the growing foetus.

Some of these figures have been taken from the 1,145 pages of *Molecular Biology of the Cell*, an internationally compiled panorama of recent findings by researchers of many nations. In this great work scientists use phrases such as:

- the simplest cell is incredibly subtle and versatile;
- phenomenal sensitivity;
- a source of astonishment;
- profound mystery (of biological clocks);
- the puzzle is that living organisms are very highly ordered at every level;
- present-day proteins have an amazingly sophisticated structure;
- (underpinning it all:) a great co-operative endeavour.

The whole book is pervaded by a strong sense of reverence for 'the life processes'. There is also acknowledgement of many mysteries still to be defined - and, some day, perhaps, solved. The basic purpose of my essay is summed up by two phrases from the book: "selfish behaviour by a mutant cell" and "Cancer cells break the rules of altruistic behaviour".¹⁹

Another paragraph is justified at this point to pay a little more attention to work being done specifically on the human brain. Its mysteries have

encouraged some twenty disciplines covering aspects of the brain's structure and functioning. Consciousness "is a rich, cognitive, affective and imaginative domain - feelings, thought, emotion, self-awareness, will". So says Gerald Edelman, one of the many scientists working in this field. The brain, he says, is dynamic dependence on signals, genes, proteins, and cell movement/division/death. "The brain is not a computer, neither is the world a length of computer tape." Edelman likens the brain to "a unique and unimaginably dense rain forest teeming with growth, an ecological habitat that mimics the evolution of life itself." ²⁰

Faith in Un-Faith

Richard Dawkins ²¹ has a very different picture from Edelman's. He puts forward three themes within evolution which are: competitive and violent struggle: "nature IS red in tooth and claw"; mechanism and determinism: "we are lumbering robots containing genes that control us, body and mind" and chance: "We can accept a certain amount of luck in our explanations ... the question is, how much?" Asking how much 'luck' we can accept in his explanation, Dawkins 'surmises' (his word) that the 'luck needed for his conclusions has the odds of one in a hundred billion billion.

Dawkins denies that there is an explanation 'gap' requiring a Creator god: "To explain the origin ... by invoking a supernatural Designer is to explain precisely nothing, for it leaves unexplained the origin of the Designer". As universalists, we must allow Dawkins and his many followers their belief that "Natural Selection, blind, unconscious process, *is* the explanation of all life ... it is the Blind Watchmaker." However, this is not the whole, or the only truth, for, in the end, the truth is unknowable.

Darwinism Now?

"The revolution begun by Copernicus and finished by Darwin had the effect of marginalising, even trivialising, human beings" ²², writes Paul Davies, articulate physicist and now philosopher. By elucidating the direct basis of Darwin's theory, modern genetics has tended to intensify that trivialisation. Phrases such as T.H.Huxley's 'whistle of the steam train', and Dawkins' 'lumbering human robots', are the results of people in different centuries

exaggerating Darwin's findings, which, as I noted, were actually modified in the fifth edition of *The Origin of Species*.

Wallace and Kropotkin, stressing values beyond narrow Darwinism, also have their successors today. Alister Hardy, who died in 1985, relates evolution to the spiritual side of the human race. His *Biology of God* shows how living organisations choose to respond to favourable environments in such a way as to enhance complexity. In turn, this points to the emergence of mind. Hardy's book ends with his hopes for "preparing the ground for a religious faith in harmony with the true spirit of science." Some who are working towards the same end are mentioned later in the essay: none I have referred to are denying the essential truth of Darwin's thinking but they, like Wallace, cannot accept life as the free-for-all which Social Darwinists proclaim.

That dignified and gentle man, Charles Darwin, could well leave us with one of his positive praises of the natural world: "Whilst this planet has gone cycling on in accordance with the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been and are being evolved." ²³ And evolution? It was multi-causal, he conceded; and in a letter to *Nature* late in his life he attacked misrepresentation of his theory - "Can (you) name any one who has said that the evolution of species depends only on Natural Selection?" ²⁴

We Are Truly Meant to be Here

This essay is primarily about contrasting interpretations of phenomena which have intrigued and puzzled people ever since self-consciousness emerged. I have suggested that there are reasons, within the normal scope of the earth sciences, why we can accept nature as having co-operation as its basis, rather than the naked struggle for survival asserted by determinists. There is support for this on-balance-benign view of nature, in the growing convictions that the universe *as a whole* cannot be a random event. There are now known to be a series of remarkable fine-tunings in the processes creating the universe as we know it. There would never have been a universe at all were it not for a balance in positive over negative particles of one in two billion, for example, in the first micro-seconds after the 'Beginning'.

But perhaps the experience of Sir Fred Hoyle would serve as the best illustration of the process whereby increasing numbers of scientists are accepting the truth of one of the Anthropic Principles (meaning that at some level the universe seems designed for the emergence of life and mind). Hoyle - an original scientist if there ever was one - had the genius to work through the

astounding intricacies whereby the first generation of stars turned helium into carbon and other atoms essential for life. When he saw the whole remarkable pattern, Hoyle tells us that he knew - instantaneously - that life could not have been accidental. He reversed his previous atheism, commenting: "To say the universe is an accident is like saying that a wind blowing through a junkyard would produce a Jumbo plane ready to fly". "The universe is a put-up job: someone has been monkeying with the rules!"²⁵

Bernard Shaw, like Kropotkin, is a great man whose time will return. Strongly influenced by Bergson's 'Life Force', Shaw had trenchant views on the Natural Selection then being peddled as the sole cause of the created world. "The mere survival of the fittest ... fails as hopelessly to account for Darwin's own life work as it does for my conquest of the bicycle ... There is a hideous fatalism about (this) Natural Selection, a ghastly and damnable reduction of beauty and intelligence, of strength and purpose, of honour and aspiration ...". Shaw concludes his devastating attack on the Darwinism at the turn of the Century, with one of the most moving expressions of a truly holistic approach to our world:

"If Natural Selection be no blasphemy, but a truth of science, then the stars of heaven, the showers and dew, the winter and summer, the fire and heat, the mountains and hills, may no longer be called to exalt the Lord with us by praise."²⁶

Henri Bergson (1859-1941) strongly influenced Teilhard de Chardin as well as Shaw, seeing evolution as "something creative, always engendering something wholly new, whose nature and coming-into-being could not have been foreseen ... Nature is an organic whole driven by a non-physical Life Force: it is thus Becoming as distinct from Being."²⁷ Samuel Alexander, an English philosopher also born in 1859, wrote massively of an evolving God who comes into being with the maturing universe.²⁸ Both Bergson and Alexander seem to have foreshadowed the self-organising systems now seen as another level of creative activity.

"What is it", asks Stephen Hawking, "that breathes fire into the equations and makes a universe for them to describe? ... Why does the universe go to all the bother of existing?"²⁹

Paul Davies must have the last word, embodying the lovely title of this Section. Davies' most recent book has as its central theme the startling fact that the human mind has been able to grasp at least some of the laws of the vast universe still expanding unthinkably beyond our gaze. "We, who are children of the universe - animated stardust - can nevertheless reflect on the nature of that same universe ... How we have become linked into this cosmic dimension is a mystery ... Through conscious beings the universe has generated self-

awareness. This can be no trivial detail, no minor product of mindless, purposeless, forces. We are truly meant to be here."³⁰

Nature: Green and Red

The scenario we now have of early life on Earth is surely very moving. Into an environment arid beyond our imagining, life emerged incalculably. Hoyle's idea of organic molecules in space seeding life here might eventually be found valid, but in any case carbon-based molecules must have built a wonderful complexity to become primitive bacteria - with the art of self-replication. We understand these bacteria to have grouped in the form of the first cells which, though primitive by existing standards, were themselves small universes creating new cells by the never-ending activities characteristic of all cellular life. Throughout these delicate experimentations and eventual success, co-operation must have been one of the first laws of life; so that the successful pattern of early cell naturally came together in the vast communities of algae and corals which have triumphantly survived through the three billion years till today (and could survive us humans!).

Nothing in that picture suggests the built-in aggrandisement upon which our determinists insist. But of course, eventually the predators duly came, and form one strand in the life processes now, as during most of the history of life on Earth. We can understand this, without condemning the whole adventure of life, if we can make vivid our sense of the tremendous energies with which living forms explored every conceivable 'slot'. Trust in 'potential' is the gift of the Creation. There was no limit on the forms life could take: all had to be tested in the actual living environment. Thus, large numbers of life forms failed, including the extreme versions of both mainstream life and the species preying (marginally) upon them. What we celebrate is the multi-strandedness of life, including competition and predation as marginal to the vast thrust of the entire life processes in the freedoms which are in no way exhausted.

Part of our problem with suffering and death in the natural world is our more intense experience arising from our self-consciousness. Do we read our own capacities into creatures not anticipating death, and whose pain has a different cut-off point from ours? Where an animal's outlook, instant-based, is unselfconsciously geared to acceptance, we are geared to protest: herbivores are presumably content with the leaves appropriate to their bodies, plus water when needed. Their horizon of content is small - witness the North American bison herd continuing to graze while numbers were falling after being shot. These

may be felt as minor considerations but we still see the predator as a disturbing symbol.

As I see it, we have to accept a price for the greater sensitiveness which presumably we and 'higher' animals enjoy. Would it have been possible for our extraordinary nervous system to have had a kind of one-way awareness - 'yes' to pleasure, 'no' to pain? Surely this would be a perversion of the creative direction we have moved in, and are still, hopefully, so doing. Two potent remarks may help here: St. Augustine's "All things are good so far as they be" ³¹; and Dame Cicely Saunders' "All is harvest" ³². The one, a gnomic benediction of life; the other, a valediction led by experience of lives accepting their twilight.

Perhaps here Blake can ease us into acceptance of the living world's subtle structures of creaturely experiences. Doubtless his sensitive spirit did not find it easy to write "The cut worm forgives the plough". His "Energy is eternal delight" is the apotheosis of the positive, though! For our time, perhaps Laurens van der Post sums it up: "'Nature Red in Tooth and Claw' is not a law of the natural world, but a projection of our own inhumanity to it" ³³.

Is Reverence, then, the Right Word?

Albert Schweitzer was one of the most gifted and sensitive men of the century. From a small child onwards he was acutely aware, to the point of nervous collapse, of the fate of 'lower' creatures at the hands of man. In his thirties he abandoned brilliant prospects in music, theology and philosophy to try to redress a little the appalling treatment of Africans by most Europeans. In the tropical forest as a doctor he wrestled for years with the problems of evil and injustice until, in a boat taking him through a herd of hippos, the phrase came: 'reverence for life'. Much of the rest of his long life was spent in working out the implications, both in his depths and in small practicalities - like Schweitzer's pet deer eating MS pages from his great work in progress *Decay and Restoration of Civilisation*: his solution - to hang the MS pages on a higher nail.

Schweitzer concluded that, intellectually, "It is impossible to understand the meaning of the whole ... what our thinking tries to proclaim as knowledge is never anything but an unjustifiable interpretation". Yet this intellectual reserve did not undermine his faith: "I believe I am the first among Western thinkers who has ventured to recognise this crushing result of knowledge ... without at the same time renouncing with it belief in the world - and life-affirmation ...". As George Seaver puts it: "His intellectual agnosticism never affected his

enthusiasm for life. It has haunted his mind but it has never depressed his spirit".

In practice, Schweitzer's dilemma was resolved in what flowed from the concept of reverence for life. He counselled that we should "tell children that the truth they feel deep down in their hearts are the real truths. God's love speaks to us in our hearts and tries to work through us in the world. We must listen to that voice - as to a pure and distant melody that comes to us across the noise of the world's doings." ³⁴

*There is one sin: to call a green leaf grey
Whereat the sun in heaven shuddereth
There is one blasphemy: for death to pray,
For God alone knoweth the praise of death.*
G.K. Chesterton ³⁵

Greenness as a Cousinly Activity

The implicit connectedness of all human beings is acted out by dolphins, which are now seen as our biological cousins. Their perfection of form for their environment is thought to have been reached some ten million years ago. The brain and nervous system probably developed in parallel with man, whose brain seems to have developed rapidly, relatively speaking, about a million years ago.

Since dolphins can make no artefacts as we would know them, there is the mystery, in Darwinian terms, as to why this impressive dolphin brain has developed. Those who have seen it are awed by the dolphin ability to ride the bow wave in front of ships travelling at top speed, and their capacity to react spontaneously to every change in the ocean's currents. We know too, the intricate ballets which any group of dolphins creates at will. There is evidence of a highly complex language, thought to be capable of transmission through water over long distances. Perhaps this intense level of individual activity has a recorded store of memories of travels, sea-bed characteristics, and other dolphins. This might be analogous to the disciplined aural memory of non-literate peoples.

A further pointer lies in the recent finding that the family group of dolphins may include up to ten generations, a result of extreme care for the young and a virtual absence of enemies on any appreciable scale. Add all these factors together and one can visualise a close mesh of highly personalised awareness, probably backed by accurate group memories involving many generations.

This links up with the experience of every diver who has come to know one or more dolphins in the wild. They are aware as humans of a dolphin curiosity and joy communicating itself to the diver's own spirit. It has been said, in fact, that it is impossible to know a wild dolphin without a strong sense of joy apparently transmitted from the dolphin. Perhaps a (happy) task for future man could be the establishment of true communications with these apparently pre-Eden beings who might - who knows? - be able to lead us into less stressed orderings of life.

One might usefully add that Herman Melville's *Moby Dick* includes his personal experience of watching a number of whale families dotting the ocean at sunrise. They all faced the dawn and when the sun's disc appeared the whales raised and held up their vast flukes. Melville describes this as a 'salute'. Who knows what thoughts, memories and experiences lay within the minds of such intelligent creatures who have lived for untold millennia without enemy, and without degrading their environment?

Our World's Future: The Army of Good Causes

The holistic world view that is arising in the science disciplines coincides with a growing popular recognition that we live on the same planet which - seen by astronauts from East and West - is a jewel to be cherished. No one looking at our world from space for the first time could imagine that the world community is being faced with a mounting list of problems - all bound to be accentuated as the human population continues its inevitable rise to double that we have now - itself a doubling during the average current lifetime.

One day the deserts will have to be re-greened, the seas and air made pure, the forests re-established. Such tasks lie entirely within the drives of an international Mutual Aid. Unfettered competition may squeeze precious cash resources from pitifully poor countries, as is happening now; but such a system cannot solve the problems of a world so unbalanced in use of resources as to threaten a chaos ruled by greed and guns. This is where all views about the living world must be put to the test in action. Whatever one's own internal drives, and the belief or non-belief which results, we are all called to commitment for a world safe in terms of environment and compassion. Perhaps Greenpeace, Oxfam, Traidcraft and War on Want - to name a few of the army of good causes - are the hopeful prototypes of a new world network. To be effective this must acquire the strengths of some of the present day multinationals and global economic institutions. A future world demands, and deserves, no less.

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