Evolution's Problem Gamblers

A diagnostic profile …

FAMILY NAME: …….. Hominidae
AGE: ……. about 2.5 million years old
PROFESSION: …… gambling
MAIN BET: …….. that they have 'dual existence'
ODDS AGAINST: ……30 million to one (minimum).

When modern members of this family bet on racehorses they tend to recoil from bets that involve odds greater than 20 or 30 to one, and they would scorn punters who habitually make bets at vastly greater odds—at 500:1 for example. Such punters would be dismissed as laughably naive, or even delusional to the point of insanity.

Yet when members of this family are faced with the enigmas of biological existence, they tend to make one particular bet against vastly greater odds with barely a second thought. They bet that, unlike the other 30 million species on the planet, they live a dual existence—on two planes, one physical and the other mental or spiritual.

As in horse racing, these gamblers can bet to 'WIN', or place an 'EACH-WAY' bet:

1. **WIN**: this extreme option bets that there is some unseen supernatural power that will intervene and arrange matters in the gambler's favour if the gambler plays his or her cards right. An even bigger payoff is promised in a mystical afterlife when the gambler is supposed to become similarly unseen and endowed with unnatural wisdom and eternal life.

2. **EACH-WAY**: this moderately irrational option bets that the gambler's family is unique and separate within the biota because evolution has endowed it with three crucial assets: complex language, high intelligence, and a rational 'mind' that can juggle abstractions. Even some scientists make this bet with barely a second thought.

Homo habilis KNM-ER 1470
(1.88 m.y. old)

HOMINIDAE

Homo sapiens

Homo erectus

Homo habilis,

THE BET: 'Humans are unique'

BEHAVIOURAL CONTROL

Most humans bet that they are fundamentally distinct and separate from all other animals and uniquely exist on two separate planes—one physical and one non-physical. Of the 30 to 100 million species that now inhabit this planet no others are supposed to possess this extraordinary 'duality'.*

This bet exists in two forms:

1. Most people bet that their non-physical existence is an artifact of their 'spirituality' and is a unique attribute bestowed on humans by an unseen 'supernatural intelligence'. It invariably comes with a set of behavioural rules, and they have the option of complying with these rules to avoid misfortune, supernatural displeasure, and possibly, eternal damnation during an 'afterlife'. Meticulous compliance with these rules usually brings great rewards, especially in this 'afterlife'.

2. Many scientists similarly believe that humans achieved a unique 'duality' of existence, but via the processes of evolution. They believe that by about 30,000 years ago the rational cortex of their evolutionary ancestors had grown so large and efficient that it was able to take on a life of its own and assume behavioural control on a semi-continuous basis. This bestowed on them a uniquely rational 'consciousness' that allowed them to overrule at will, their 'baser' animal instincts.

EVOLUTIONARY STATUS

The anthropocentric propositions outlined above are founded on the general perception that humans are the 'highest', most 'advanced' form of Earthly life, either by divine appointment or via 'evolutionary progress'. Either way, humans are duty-bound to take responsible control of the natural world and are entitled to utilise whatever natural assets and resources they think might benefit them. Therefore, they also believe that humans are not bound by the evolutionary rules that govern all other species: they are 'Special'.

*** Odds against this bet: at least 30 million to 1**

THE FACTS: 'Humans are NOT unique'

BEHAVIOURAL CONTROL

The biological facts suggest that humans are not unique among the Earth's biota in any fundamental aspect of their structure or behaviour. This is corroborated by the universal nature of the genetic material that builds and orchestrates the behaviour of all species, including humans.* In other words, there is no hard evidence to support the propositions:

(a) that human bodies incorporate any unique chemistry or structures,

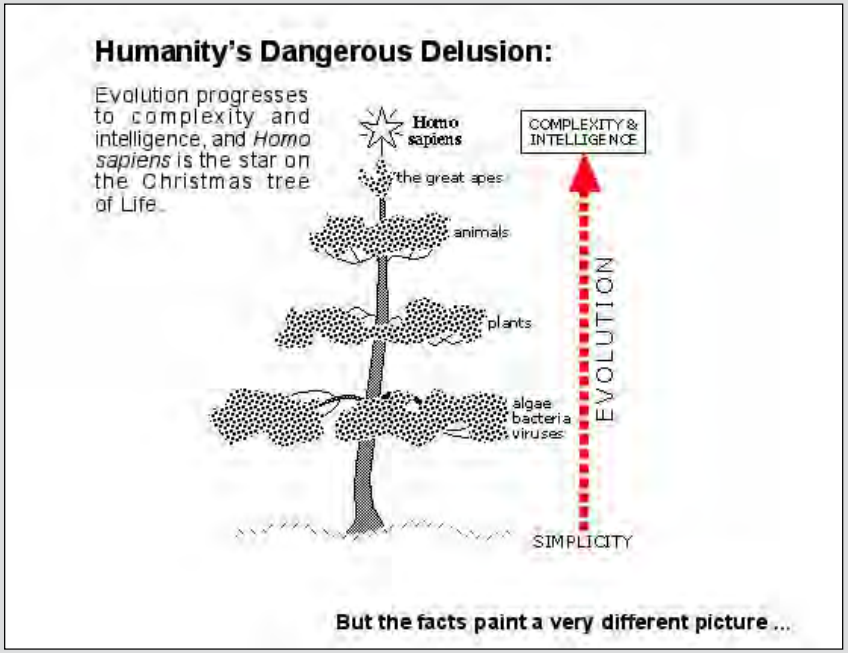
(b) that they exhibit any behavioural imperatives that lie outside the standard genetic repertoir—those associated with the fundamental imperatives to survive and reproduce. In short, all biological behaviour, whether plant or animal, originates in the genes via the proteins they express. This means that no animals display human behaviour and humans display only animal behaviour that has been selectively modified to suit the species' evolutionary circumstances. The clearest evidence of the genetic origin of human behaviour appears in a society's 'morality'. Operating in committee-like groups, genes often 'lobby' for conflicting strategies. This results in the so-called 'moral dilemmas' that characterise daily life. Consequently, its dilemmas invariably expresses discords between strategies that contribute to the short-term survival of the individual's genes versus those that aid the long-term survival of their alleles in other individuals.

EVOLUTIONARY STATUS

The biological facts suggests that the evolution of life is an artifact of Earth's energy-loaded crust. It therefore represents an aspect of the planet's energy dissipation within the chaotic process of cosmic entropy. It also suggests that the evolutionary process has nothing to do with 'Progress' or 'Improvement', but merely expresses the tendency of all species to diversify and gain complexity in their struggle to harvest energy and resources that lie beyond the reach of simpler competitors. Humans are therefore not 'Special' and are entirely bound by evolution's rules.

*** Odds against this bet: better than 1 : 1**

THE BET



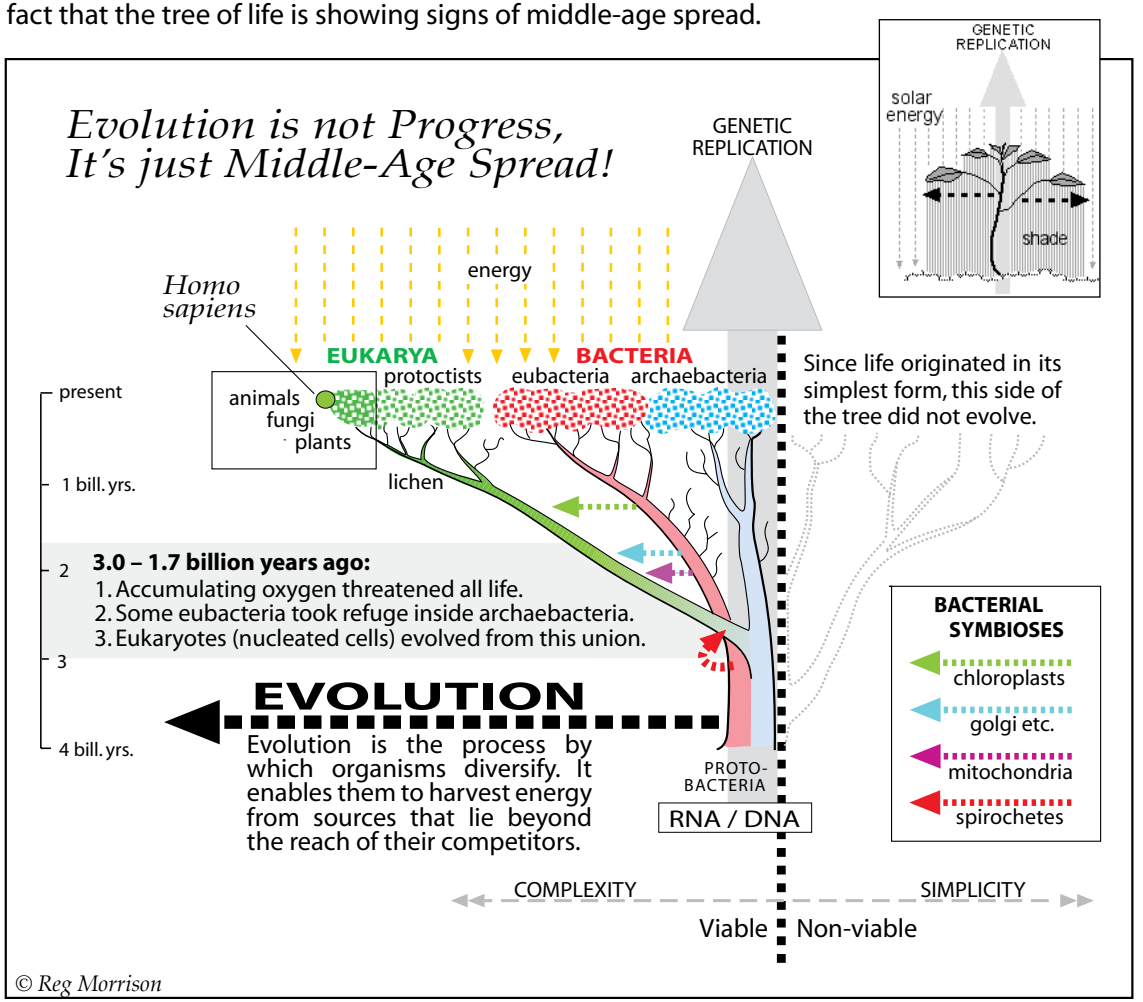
This Christmas-tree of Life represents the traditional idea of humanity's place within the natural scheme of things. Such anthropocentric (human-centred) views probably originated with the very earliest groups of humans some two million years ago when the growth of rudimentary language and tribalistic mysticm were fashioning the mental fangs and claws that evolution had failed to provide.

Armed with a mythology of ferocious heroism and a mystical belief in their tribal primacy, our hunter-gatherer ancestors gradually gained ascendancy over the daunting array of predators that roamed the ice-age world between one and two million years ago, and this enabled them to disperse swiftly and adapt to a wide spectrum of habitats around the planet.

The religion-based tribalism that characterises modern civilisation is a relic of those vital primal myths. Detached as it is from its original environment however, this ancient myth now seems certain to disable us as the global environmental deteriorates. Polyglot populations will splinter into tribal groups characterised by tribalistic aggression, and cooperation will become impossible, thanks to this delusory bet.

THE FACTS

All life shares a single driving mechanism—genetic material in the form of DNA and RNA. These complex molecules survive by replicating themselves, so the primary drive of all life is to reproduce itself. This requires energy. Plants harvest most of the energy they need from the sun, thanks to photosynthetic bacterial relicts in their leaves. As their leaves multiply however, the increasing density of new leaves forces branches to grow continually outwards in search of sunlight. The same rules apply throughout the biota. New species are continually forced to diversify 'outwards', acquiring complexity both in structure and behaviour in order to harvest energy that lies beyond the reach of simpler competitors. So life's tendency to acquire complexity and diversity over time does not represent 'Progress': it merely corroborates the fact that the tree of life is showing signs of middle-age spread.



SUMMARY

THE BET

According to our perceptions humans are a unique species that exists on two separate planes: one physical and the other mental. In other words, we possess what is known as 'duality'.

• Whether our apparent 'duality' evolved, or whether it has been shaped by supernatural intelligence, we perceive ourselves to be essentially conscious and rational. Our behaviour therefore appears to be unique in that it seems to be basically rational and distinctively human.

• Since we believe that we are both conscious and rational it follows that we are ultimately responsible for our actions.

This bet is very attractive,
but at '30-million-to-one'
it is obviously irrational.

THE FACTS

According to biological evidence humans are a typical primate species and display only primate behaviour in all situations that have the slightest bearing on the survival of their genetic line, including their alleles.*

• Being purely the product of genetic and Darwinian evolution our species must obey evolution's rules for genetic survival, or risk extinction.

• As typical animals, humans are neither rational nor 'responsible' in a conscious sense. Morality and all its behavioural dilemmas are the by-product of valid but often discordant genetic imperatives.
Examples:
(a) "Preserve the individual genome" ('selfish' option)
(b) "Preserve those who carry alleles" ('heroic' option)

These facts are unattractive, but logical.

This means that our common rejection of them must be due to a genetic bias.

So two crucial questions arise …

***ALLELE**: *A similar gene that resides on a corresponding chromosome in another individual and performs a similar function.*

TWO CRUCIAL QUESTIONS:

1. How do our genes manipulate our perceptions?
2. Why do our genes manipulate our perceptions?

To explore these questions we first need to look beyond genetics and consider … EPIGENETICS

EPIGENETICS

Few people seem to be aware that DNA is subject to an overriding 'epigenetic' code in the form of hydrogen-loaded carbon 'tags' that are attached at various points along the side rails of the double helix. These carbon tags determine whether or not particular genes or groups of genes are available for transcription. Their pattern of attachment is known as methylation.

If all of the DNA present in each of our cells was stretched out in a line, it would be almost 3 meters (10 feet) long, so DNA must be folded up and compressed to fit inside the cell nuceus. In general, genes in tightly compressed DNA are not readily expressed, while DNA that is more loosely packed is more accessible to the machinery involved in transcribing its genes into messenger RNA (mRNA), and thereby into protein. Appropriate DNA methylation is therefore essential for protein production and for the appropriate development and functioning of an organism.

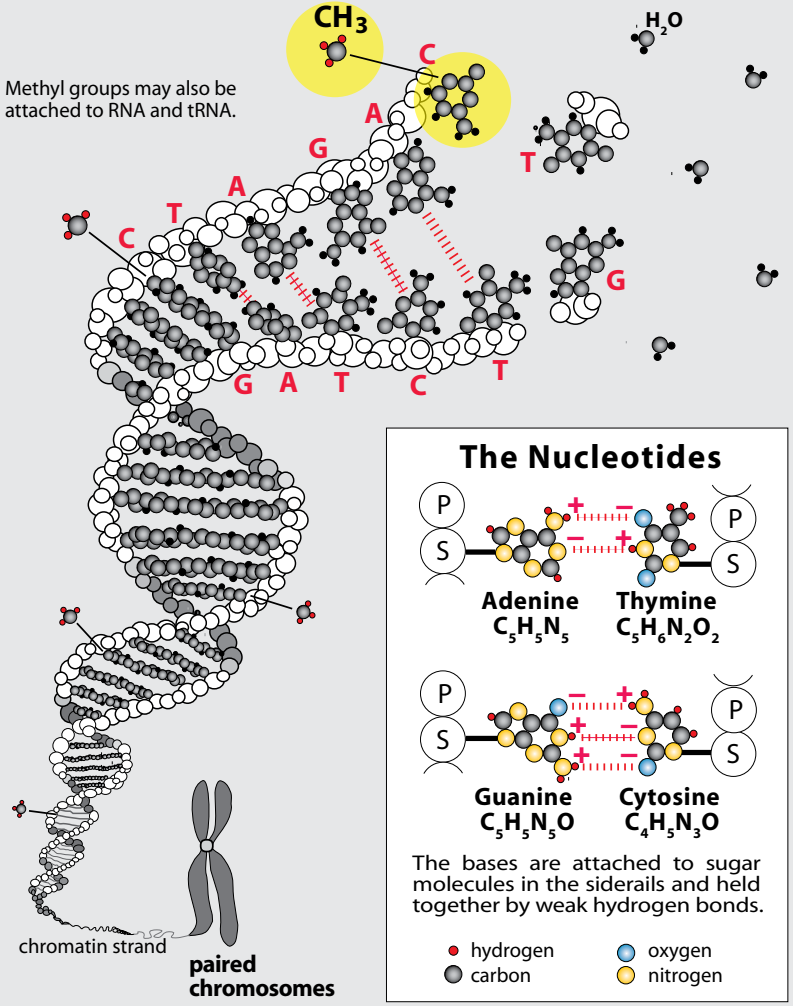
This mastercode is highly flexible in that there are both internal and external factors that are able to interfere with the sequence of its methyl tags. Some viruses, bacteria and chemical pollutants appear to disturb the body's basic patterns of methylation as does the body's own immune system, its hormonal response to stress, and the process of aging. Such factors are thereby able to produce, via these subtle Lamarckian interventions, small changes in the structure and behaviour of an organism in response to changes in its environment. Our species offers no exception to this rule.

So although our genes determine our fundamental structure and behaviour, our overriding epigenetic code orchestrates all the finer details of our mental and physical existence.

DNA Methylation

Methyl tags (CH_3) are most commonly attached to cytosine, but occasionally to adenine and other sites, including the histone 'bollards' about which the strands of chromatin are wrapped.

Adenine (A) ⁞⁞⁞⁞⁞⁞⁞⁞ (T) Thymine
Guanine (G) ⁞⁞⁞⁞⁞⁞⁞⁞ (C) Cytosine
hydrogen bond ⁞⁞⁞⁞⁞⁞⁞⁞



The Nucleotides

The bases are attached to sugar molecules in the siderails and held together by weak hydrogen bonds.

hydrogen · carbon · oxygen · nitrogen

By regulating the folding pattern of DNA's chromatin strands its methyl tags determine which genes can be transcribed and which are 'switched off'. DNA's epigenetic code thereby constitutes a highly flexible gene-management system that is sensitive to external and internal interference initiated by environmental factors.

Reg Morrison, 2009

DNA Methylation

The most dramatic illustration of methylation occurs in ornamental corn. Its kernels are dark purple if a 'Red' gene is inherited from the egg (female), but they are blotchy lavender if the same gene is transmitted via sperm. This observation was first made in 1910. Today we know that in corn pollen, which contains the plant's sperm cells, the Red gene is methylated. During kernel development the methyl tags are successively removed, thereby allowing full genetic expression to gradually appear as it matures.

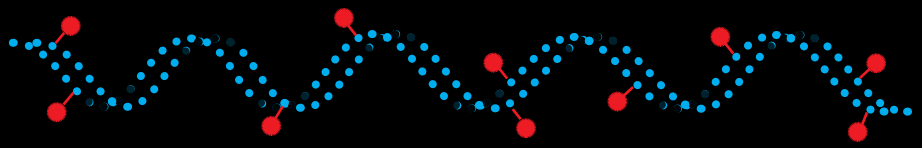
In the human fetus methylation determines what type of cell each one becomes, for example whether it is a red blood cell, a brain cell, a muscle cell, or a skin cell. Every cell in our bodies contains two copies of every one of our genes, with one copy of each gene coming from our mother and one copy from our father. Each gene is thereby 'imprinted' with its parent's peculiar pattern of methylation (The exceptions to this rule are genes on X or Y chromosomes, the sex chromosomes that determine whether we develop as males or females.)

When a cell's methylation machinery malfunctions it can often cause serious developmental problems. People with mutations that cause abnormal function of the methyltransferase enzyme Dnmt3b develop a disease called ICF syndrome. These people have abnormal immune systems and other genetic problems. Similarly, those with abnormalities in a protein called MeCP2 develop Rett syndrome, a form of mental retardation affecting young girls. In other words, we cannot develop or function normally unless we have the appropriate DNA methylation.

The colour variations in ornamental corn graphically display the process of gradual de-methylation.

DNA methylation

heritable and memorable in humans

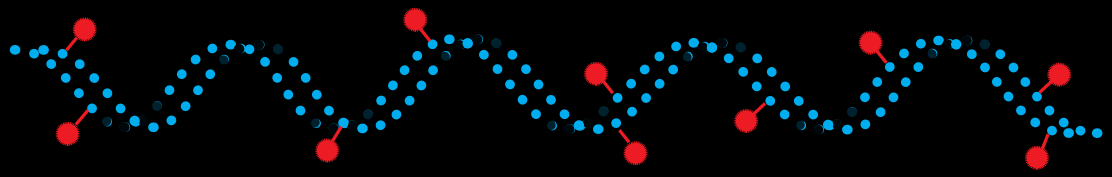


Autistic reactions, such as the one shown here, are now believed to be a byproduct of inappropriate 'imprinting'.

Traumatic stress in childhood, or a lack of appropriate parental nurturing during our developmental years has also been shown to slightly alter our methylation patterns. Such changes can significantly alter our perceptions of the world around us, and can thereby remould our adult behaviour to some degree. [1]

Meanwhile, methylation also plays a major role in shaping memory— both short-term and long-term memory …

MEMORIES ARE MADE OF THIS



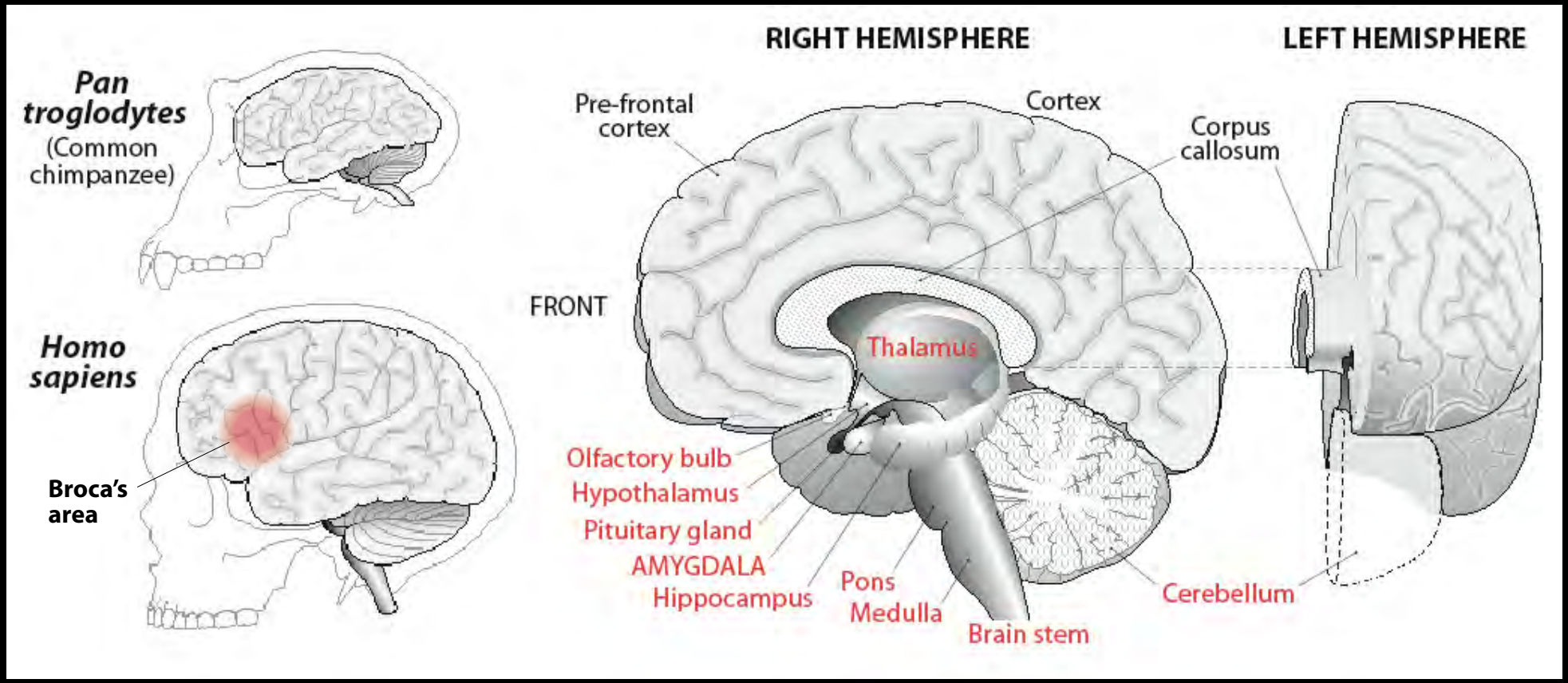
SHORT-TERM MEMORY: This mammalian characteristic appears to be based on epigenetic changes that emerge in the DNA of neurons in the brain's hippocampus in response to environmental stimuli. The resulting methylation pattern and its associated memory tends to disintegrate within a few days.

LONG-TERM MEMORY: This appears to be a faint cortical 'echo' of the short-lived hippocampal changes, but these changes are much more permanent and become semi 'fossilised' in the methylation patterns of cortical DNA. [2]

The human cortex has doubled its volume and quadrupled its surface area during the past three million years and is now able to archive a large number of these minor changes. This archive constitutes a very useful form of long-term memory—fragmentary, error-prone and malleable though it may be.

Consequently, methylation plays a major role in manipulating our perceptions of the world around us and thereby plays a major role in shaping our day-to-day behaviour.

Evolution of the human brain



The structures labelled in red are the brain's ancient mammalian-reptilian components. Incoming sensory information is immediately assessed in these regions, and if behavioural responses are required, the unconscious brain's decisions are then passed to cortical regions for translation into conscious action and conscious opinion. After some preliminary word-processing in Broca's area these opinions may also be translated into oral, written, or sign language. They may then be used internally in silent, personal conversations, or announced externally as public statements. In short then, we are typical animals driven by genetic decisions that have already been thrashed out in the secret parliament of genes that is housed in the ancient, unconscious basement of the brain. These decisions and opinions only enter our consciousness some 500 milliseconds later, after they have been fired outward into the 'conscious' cortical regions of the brain. Unaware as we are of the primary assessment that occurred in the brain's basement, we are then easily fooled into the belief that we are thinking them out for ourselves, consciously and rationally. [3]

We can now return to our primary questions:

Vietnam Moratorium march, Perth, 1969.

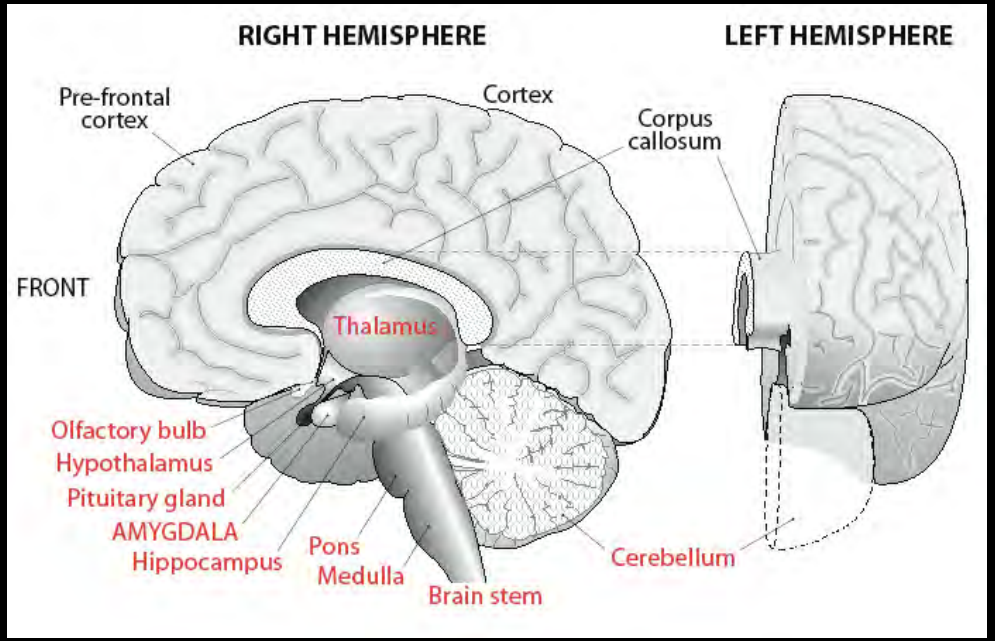
1. **HOW do our genes manipulate our perceptions?**
2. **WHY do our genes manipulate our perceptions?**

The mechanics of delusion

The brain structures and neuronal pathways that achieve these crucial genetic responses have now been largely identified. They lie, as might be expected, in the older structures at the core of the brain. Central to these are the hypothalamus, the pituitary gland and the small, almond-shaped amygdala. The amygdala seems to be primarily involved in appraising the genetic significance of situations in which an immediate threat might be involved. In other words it governs the fight-or-flight reflex, and determines the particular thresholds of aggression and discretion that characterise each one of us.

Meanwhile the hypothalamus, in conjunction with the pituitary gland that sits just below it, seems to act as the master control system for a wide diversity of other phenomena, including structural growth and the physical expression of mental states. Its speciality however, lies in the expression of emotions. Electrical stimulation of one part of the hypothalamus can unleash rage and a full-blown attack response, both in humans and other mammals, meanwhile stimulation of a neighboring part of the hypothalamus can elicit feelings of intense pleasure.

Since the hypothalamus and amygdala are part of the 'limbic system', which includes all of the ancient mammalian-reptilian structures at the core of the brain plus the brain stem, they are ultimately linked both to the sensory system and to the autonomic nervous system. The limbic system thereby provides our genes with an automatic 'choke' that is able to flood the entire body with the appropriate chemistry for slipping into top gear from a standing start, bypassing the rational brain entirely. [4]



ABOVE: Limbic systems hard at work, 'by-passing the rational brain entirely.'

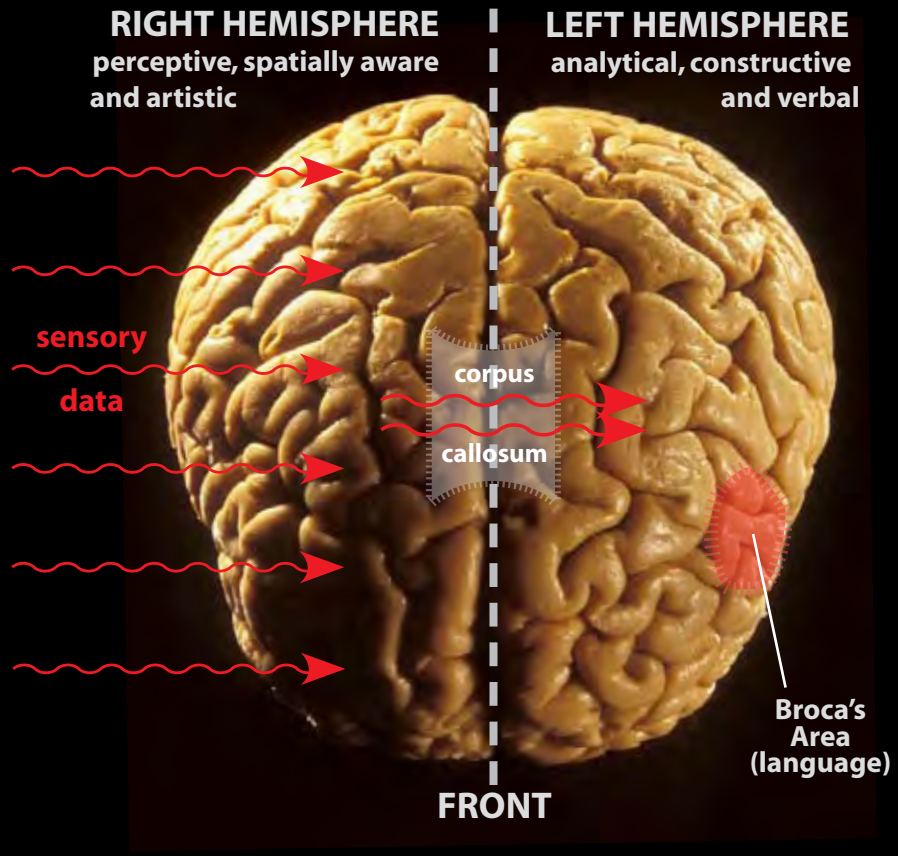
Our split brain - 1

After a long series of experiments in the 1960s with patients whose brain hemispheres had been surgically separated (by cutting the strap-like corpus callosum that directly links them), neurobiologist Roger Sperry found himself forced to conclude that: 'surgery has left these people with two separate minds, that is, two separate spheres of consciousness.' He added that 'this mental dimension has been demonstrated in regard to perception, cognition, volition, learning and memory.'

In most cases, severing the corpus callosum separated the right hemisphere from its only means of communication with the outside world, the left hemisphere's language factory known as Broca's Area. In one extraordinary case however, a split-brain patient who had sustained some left-hemisphere brain damage as a child revealed verbal competence in both hemispheres after surgery.

Sperry and his colleagues were then able to communicate with each hemisphere separately, and during extensive tests designed to reveal the patient's personality, discovered that ***two entirely separate and distinct characters inhabited the two hemispheres.*** [5]

Equipped in this fashion with the capacity to operate on two levels of awareness while being 'conscious' of only one, our hominid ancestors were sitting ducks for the evolutionary sting that followed. That gap between the two spheres of human awareness left genes with precisely the loophole they needed to retain ultimate control of the body's entire communications system. If the analytical and constructive hemisphere, the left, was not at all times fully aware of the wide range of perceptive activity occurring in the right hemisphere, then here was a gap in the cortical defences through which whole truckloads of mystical nonsense might pass virtually unchallenged.



Of the torrent of sensory data that enters the receptive right hemisphere relatively little is accurately transferred via the corpus callosum to the analytical and communicative left hemisphere.

Significantly, the one area of the brain where sexual dimorphism is most evident is the corpus callosum. The female version is thicker and more bulbous than the male version, and has far more nerve fibres linking the two hemispheres than has the male. Consequently men have poorer communication between the left and right sides of their brain. [6] *It is as if evolution specifically widened the 'brain gap' in men to ease the birth of their elaborate mystical fantasies.*

Our split brain - 2

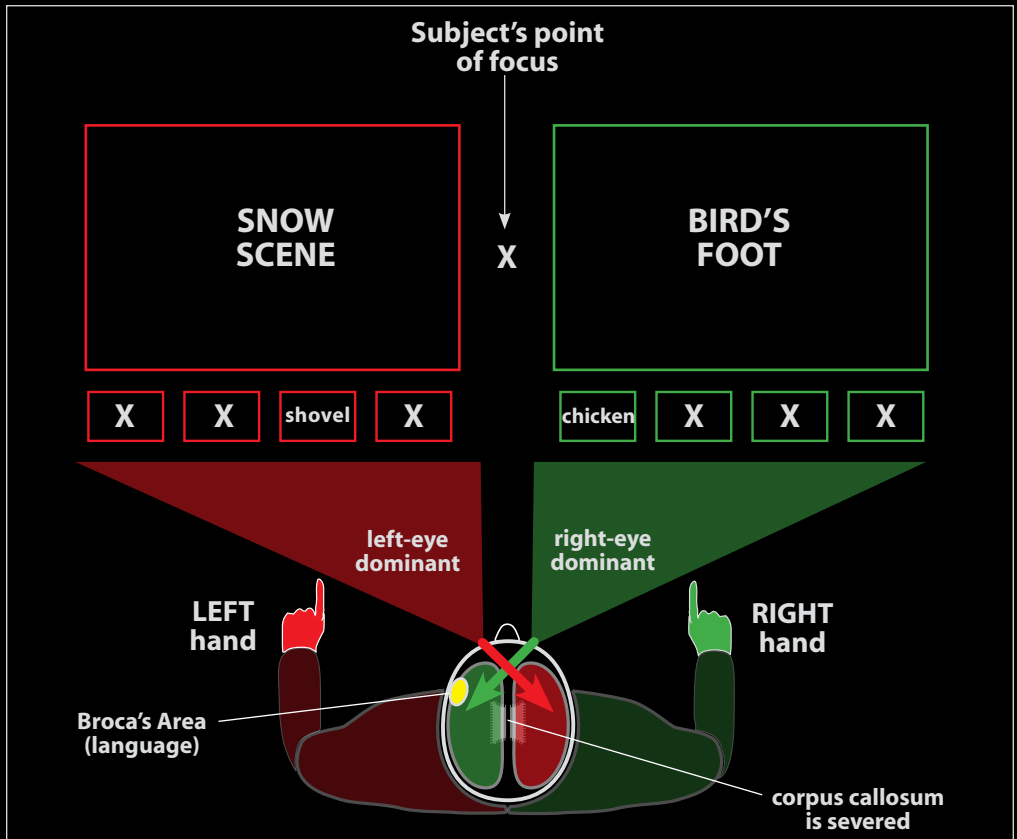
During experiments with a split-brained patient conducted in the 1970s by Michael Gazzaniga in collaboration with Roger Sperry, a picture of a bird's foot was flashed to the patient's left hemisphere via his right eye, and a picture of a snow scene was presented to his right hemisphere via his left eye. Below these images were four smaller pictures, only one of which could be readily associated with the main image. When asked to identify these connections he correctly chose a shovel with his left hand (controlled by the right hemisphere) and a chicken with his right hand (controlled by the left hemisphere). When asked to explain his choices, he responded: "Oh, that's simple. The chicken claw goes with the chicken, and you need a shovel to clean out the chicken shed." [7]

Gazzaniga concluded that the left brain observed the left hand's choice of a shovel—which stemmed from the right brain's nonverbal, inaccessible knowledge—and offered a fictional explanation to conceal its ignorance of the real reasons for that choice.

Further work indicates that the left-brain can influence memory—sometimes for the worse. In one study, Gazzaniga and his colleagues presented an assortment of novel pictures to the left hemisphere of split-brain patients. Where these new pictures shared elements or themes with a picture that the patients had already studied, the patients often mistakenly identified the new ones as having been seen previously.

It seems that our Broca's Area cannot abide a vacuum, and so wherever there is an information gap, it constructs a fictional narrative that might reasonably account for the body's inexplicable right-brain activity.

Here then, is the curious brain machinery that underpins our mystic visions, religious experiences and spiritual fantasies, as well as our false-memories and tiresome conspiracy theories.



Each of our eyes is linked to the opposite hemisphere of the brain via a crossover of the left and right optic nerves. In similar fashion the left and right sides of the body are also linked to the opposite hemispheres of the brain. The linkage is exclusive when the corpus callosum is cut.

It is important to remember that in most humans only the left hemisphere of the brain has a voice, since language is assembled in Broca's Area. Consequently, the right brain has little say in the continuous stream of propaganda that is issued, both internally and externally, by this obsessively active facility.

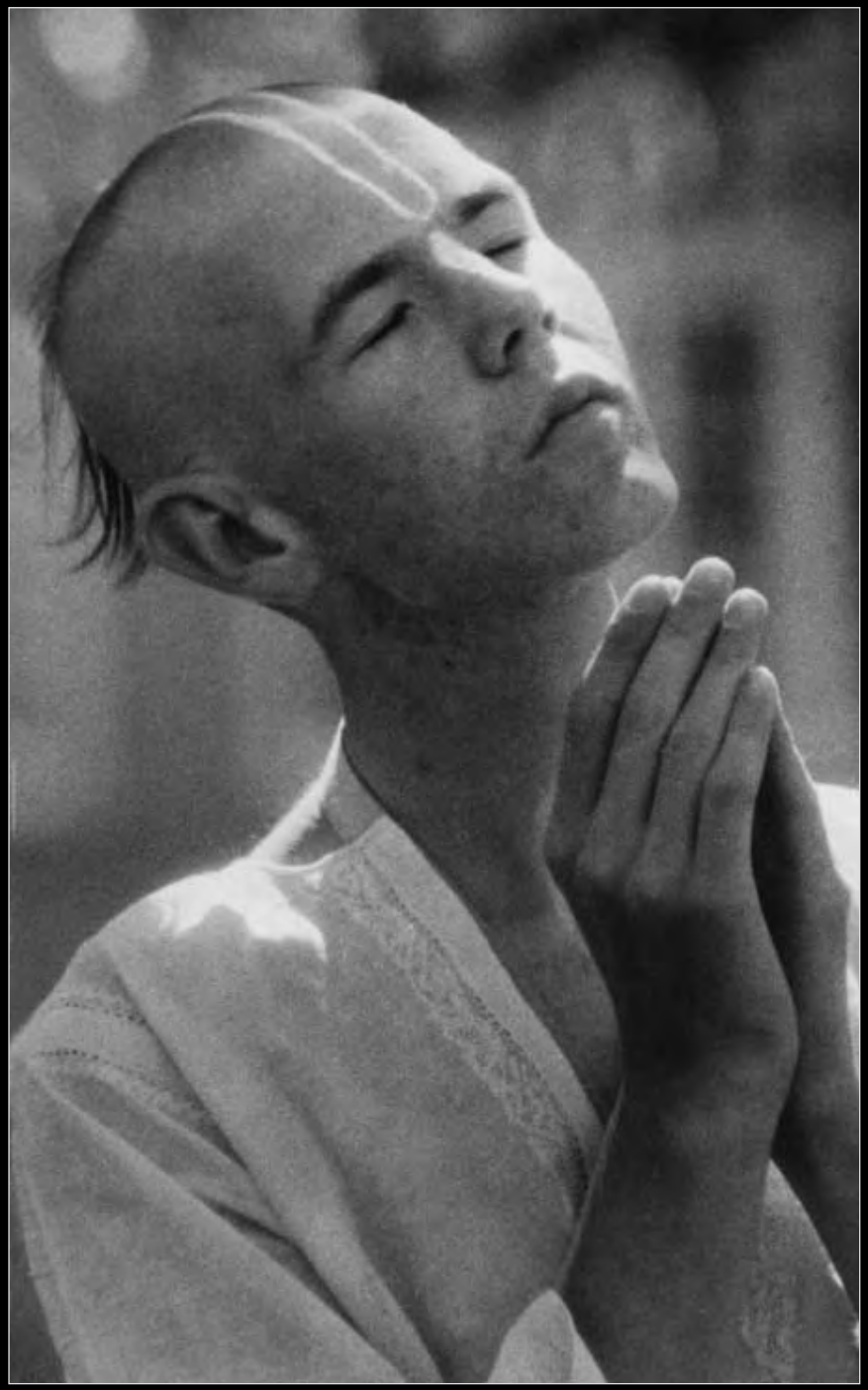
The Birth of Culture

Two million years ago the key to human survival would have been membership of a tribe. Lone warriors, roaming the dangerous plains of East Africa, would have enjoyed very short lives indeed. Slow, puny, and bereft of fur, claws or fighting teeth, even the bravest and strongest of them would have been no match for the ice-age predators of those times. But by hunting in packs that prized and rewarded altruistic tribal loyalty and heroic cooperation above all, *Homo sapiens* gradually became one of Africa's most formidable predators.

The powerful discord that arose between the primary genetic imperative to survive and reproduce, and the genetic imperative to defend the tribal gene-pool—with life and limb, if necessary—remains with us still. This discord and its attendant tides of emotion characterise all of the moral dilemmas of today, just as they did two million years ago.

But although culture and its morality is plainly a byproduct of our genes, it is essential that we remain blind to this fact. If we could see its genetic origins more clearly we would be unable to manufacture sufficient emotion to make our tribalistic cultures work. Our genes therefore prefer that we take the 1 in 30 million bet and believe in the imaginary forces of Goodness and Evil, and in one or more of their unlikely agents—gods, angels, witches, astrologers, psychics, clerics and politicians, to name but a few.

But an old evolutionary problem remains: how do you marry such spectacularly irrational beliefs with an unusual talent for rational thought, and still keep the primate brain running relatively smoothly? (It is indeed a neat genetic trick!) …



Solving the 'Rational' dilemma

In order to properly accommodate a vital streak of mysticism in an increasingly rational brain it was first necessary for humans to perceive, quite accurately, that their genetic imperatives—in the form of instincts, feelings and desires—represented a source of considerable wisdom and 'super-natural' power; and second, to believe, quite irrationally, that this inner wisdom had its roots in an invisible world of super-intelligence, a mystical world that lay beyond rational comprehension.

In this fashion, evolution had hit upon the sweetest of solutions. Such perceptions were guaranteed to produce a faith-dependent species that believed itself to be thoroughly separate from the rest of the animal kingdom, but followed its genetic instructions to the letter—and left more offspring as a consequence.

Here was a gene-driven animal just like any other, and yet one that believed itself to be under special guidance that was not merely 'spiritual', but in most instances 'divine'. Here was a very practical insanity indeed, one that eventually enabled this physically under-endowed 'paragon of animals' to devour the planet like a ripe fruit. (*Homo sapiens* now appropriates almost 40% percent of the solar energy that is photosynthetically trapped by the world's terrestrial vegetation.)

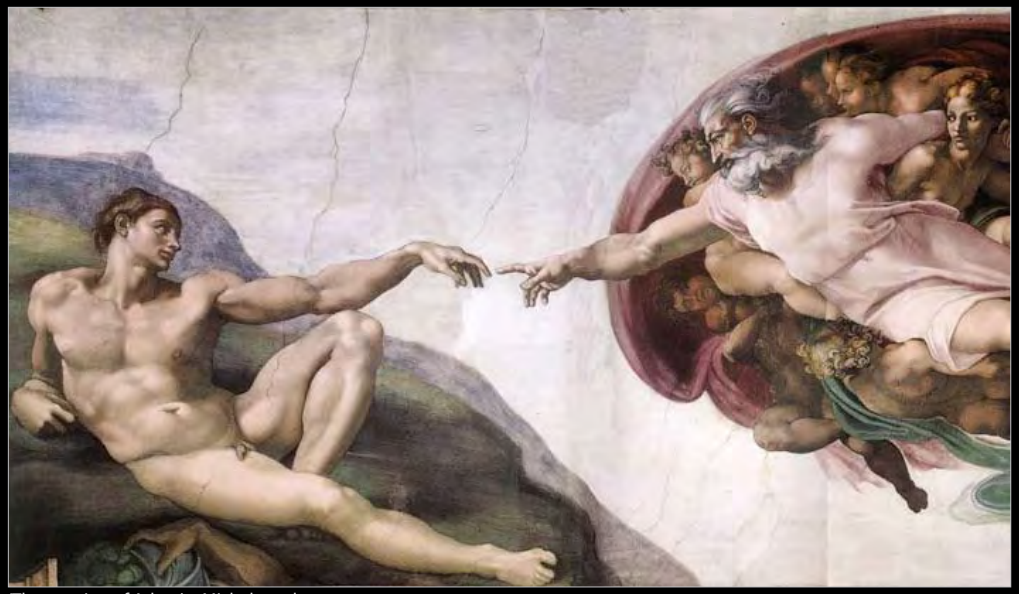
So here at last was a substitute for the fur, claws and fighting teeth that evolution had failed to provide, and here in the guise of mysticism, was the *Excalibur* that would eventually catapult our species from the brink of extinction to global domination and evolutionary stardom.

It might even be argued that human mysticism evolved specifically to counter the development of the rational cortex in that it was clearly aimed at circumventing our talent for critical analysis and reasoned thought whenever our genes came under threat.

The magic of mysticism ...

"The less you see, the more you believe"

Jacques Tourneur
(Director of horror-films)



'The creation of Adam'—Michelangelo

... in

Religion,

Morality,

Fantasy!

'The Redhorn Gate"—Ted Nasmith. All Rights Reserved. Used with artist's permission.

All mysticism is fundamentally founded on a lack of factual evidence. 'Blind faith' is the essential ingredient in our need to believe all kinds of fiction—gods, devils, angels, villains and super-heroes; luck, astrology, memetics, conspiracy theories and endless economic growth ...

'The Nightmare'—John Henry Fuseli

'The Terminator'—© Jorge Alberto Lizama.

Thanks to highly talented artists in a variety of media, our genetic yearning for mysticism is continually spoon-fed with spectacular images that are eminently believable.

The ultimate enigma

If people ceased gambling on the chance existence of supernatural forces
and began to trust the overwhelming evidence of biological fact,
cultures would collapse, civilization would grind to a halt,
and our species would wind down to its extinction.

We are evolution's problem gamblers.
We know no other way
of living.

Here is an aside that was scribbled in a notebook 150 years ago
by one of our species' most accurate and perceptive observers of the natural world:

"Thought, however unintelligible it may be, seems as much a function of organ, as bile of liver.
This view should teach one profound humility, no one deserves credit for anything.
[N]or ought one to blame others."

(Charles Darwin)

Sadly, this fact-based proposition is as unpalatable now as when Darwin noted it,
and he very wisely refrained from pursuing the subject in his books.
Had he pursued it, his books would have been burnt as heresy,
his seminal insights would have been spurned,
and his work would have slipped
into obscurity.

THE PEACOCK EFFECT

Evolution's great strength lies in the fact that even the most efficient and fecund species are vulnerable to culling. This universal vulnerability hinges on what might called the Peacock Effect. In peacock society the male's spectacular tail is a major reproductive asset, but only in the species' birthplace—a forest. Should the forest disappear, the peacock's cumbersome tail instantly doubles as a gaudy advertisement for fast food in the eyes of any passing predator.

All species possesses adaptive specialisations that have enabled them to survive and reproduce within the habitat that nurtured their specialisation. But change the environment, and such specialisations become handicaps—the more extreme the specialisation, the more lethal the handicap. In other words, each species has its own personal peacock tail, even that paragon of animals, *Homo sapiens*. In an evolutionary sense our peacock tail is just as spectacular as the bird's, although you wouldn't know it to look at us. The difference is that it is entirely intangible and very well concealed, residing as it does in the three billion base pairs of our DNA.

Our peacock tail is our inherently mystical nature. It is expressed in our peculiar capacity to believe implicitly in the patently unbelievable, and to attribute unnatural power or mystical significance to anything that either contributes to, or threatens, our genetic survival—thereby revealing its true origin. Mysticism's universality and its umbilical links to DNA's primal imperatives, 'survive and reproduce', clearly identify it as a genetic artefact.

Whether our mysticism relies on a belief in supernatural forces such as gods, angels, witchcraft, astrology and intergalactic aliens, or whether we believe in luck, tea leaves, memes or market forces, the precise nature of the belief is of little consequence to our genes. The only thing that matters to them is the quality and strength of the tribal passion that those beliefs generate. Darwinian selection does the rest. Two million years of hunter-gatherer hardship has honed human mysticism into a weapon of unparalleled power—an evolutionary Excalibur …

OUR EXCALIBUR

"The widespread acceptance of such credos as creationism, astrology and sustainable economic growth gives adequate warning that the fraction of the population capable of applying even the most basic rules of evidence to mystically derived information is so small as to be inconsequential. It means also that the most seductive and dangerous forms of mysticism, those that underpin racism and religious fundamentalism, are totally bullet proof.

By selectively preserving the mystics among our hominid ancestors evolution not only gave us the weapon that would catapult us from obsolescence to world domination, it seems also to have taken out a shrewd insurance against our overwhelming success. Only such a deliciously rewarding and tamper-proof device as mysticism could have prevented us from foreseeing the danger of overpopulation a long, long time ago.

But despite the folly and the pain that mysticism breeds, we should dread its disappearance. Without it, no dingo would howl nor nightingale sing. Spring, like all life, would be a silent thing indeed.

We may not be able to hurl our Excalibur back into the gene pool from whence it came, but we owe it to our children to lower our shining weapon for a moment or two so that we might gaze just once with undazzled eyes upon this ailing Camelot of ours." (*The Spirit in the Gene,* 1999)

As with *Excalibur*, mysticism comes with a Faustian bargain embedded in it . . .

Although mysticism gave our tribal ancestors the most formidable weapon ever unleashed on this fertile planet, amid their final flurry of reproductive success, the mystically based tribal bonding that underpinned our species evolutionary success will now work to undermine and destroy us.

Our peacock syndrome has begun its endgame. The ancient Gaian hunter, evolution, is closing in, and the heavy load of mystical tail-feathers that we carry will ensure that escape is no longer possible . . .

EVOLUTION'S AUTOMATIC PLAGUE LIMITER

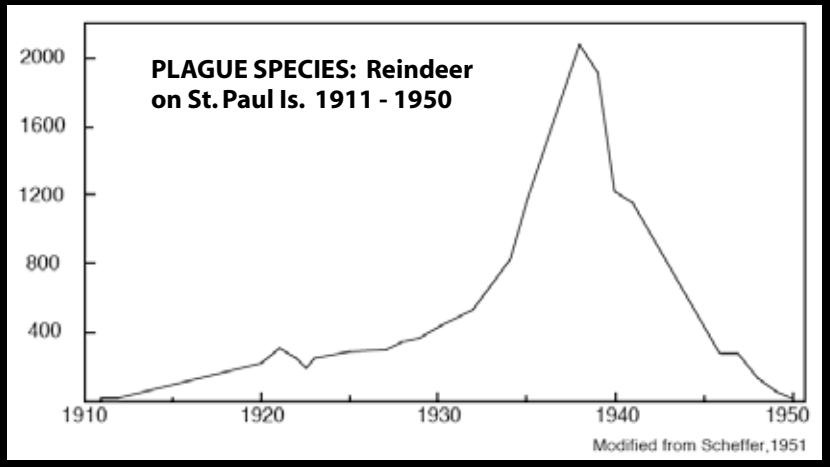
Exponential population growth by a highly successful species threatens the survival of other species that share its habitat and compete for its energy resources. Inevitably perhaps, an automatic plague-limiting device has evolved. It consists of a combination of hormones, enzymes and epigenetic switches that interact to bring exponential growth to a halt and reduce the fecundity rate below replacement level.

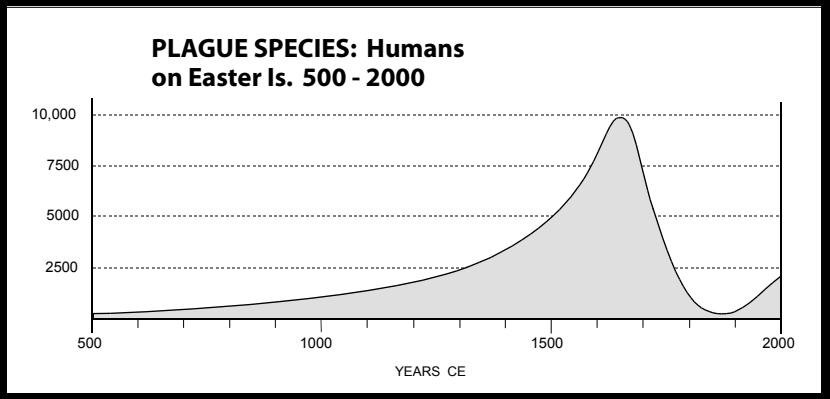
This little-known reproduction brake cuts in well before the environment collapses and food shortage launches the final culling process—as outlined by the Reverend Thomas Malthus in his 1798 essay on population.

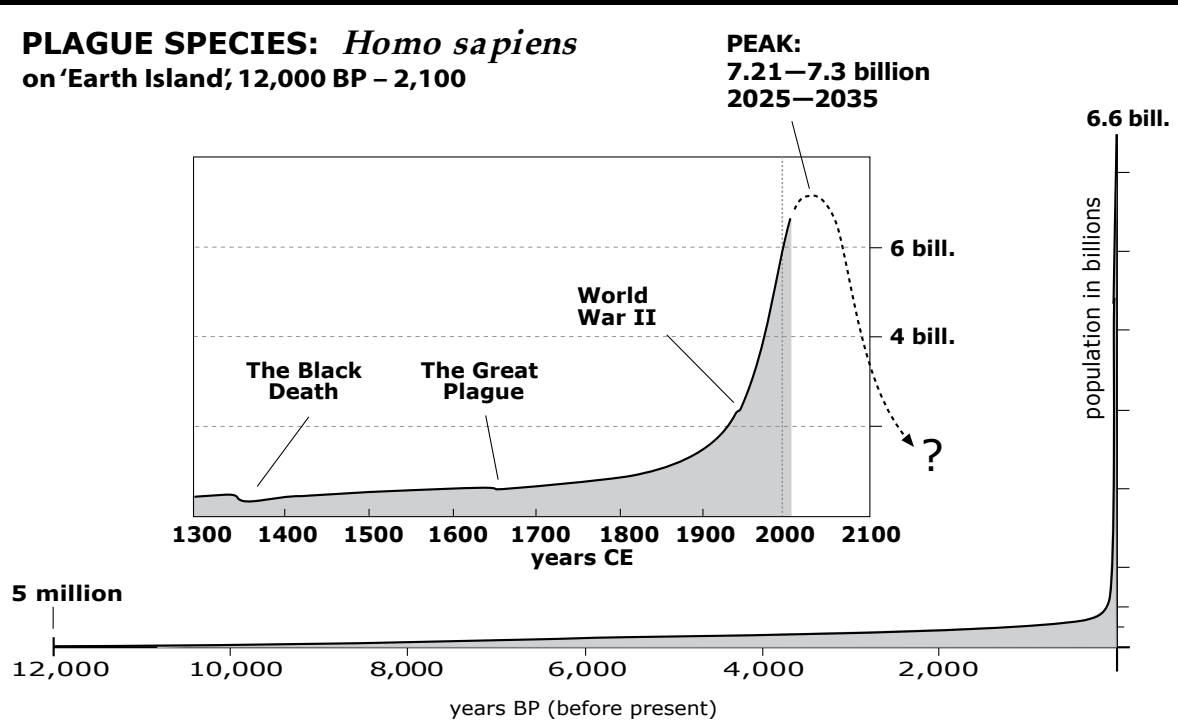
Known as the General Adaptation Syndrome, this evolutionary safeguard was first defined in rodents by Canadian endocrinologist Hans Selye in 1936. He realised it was a stress related response to exponential population growth, and his research showed that it occurred regularly in rodents, both in the wild and in laboratory populations. It later became clear to him that it also applied to many other species, especially humans.

By applying an automatic brake to exponential population growth during an animal plague the General Adaptation Syndrome (GAS) imposes a crucial upper limit to the degree of damage that such events might otherwise inflict on the regional biota.

Reindeer populations on two islands in the Bering Straits and the human population on Easter Island illustrate the smooth transition from the GAS to a comprehensive population collapse due to resource starvation.



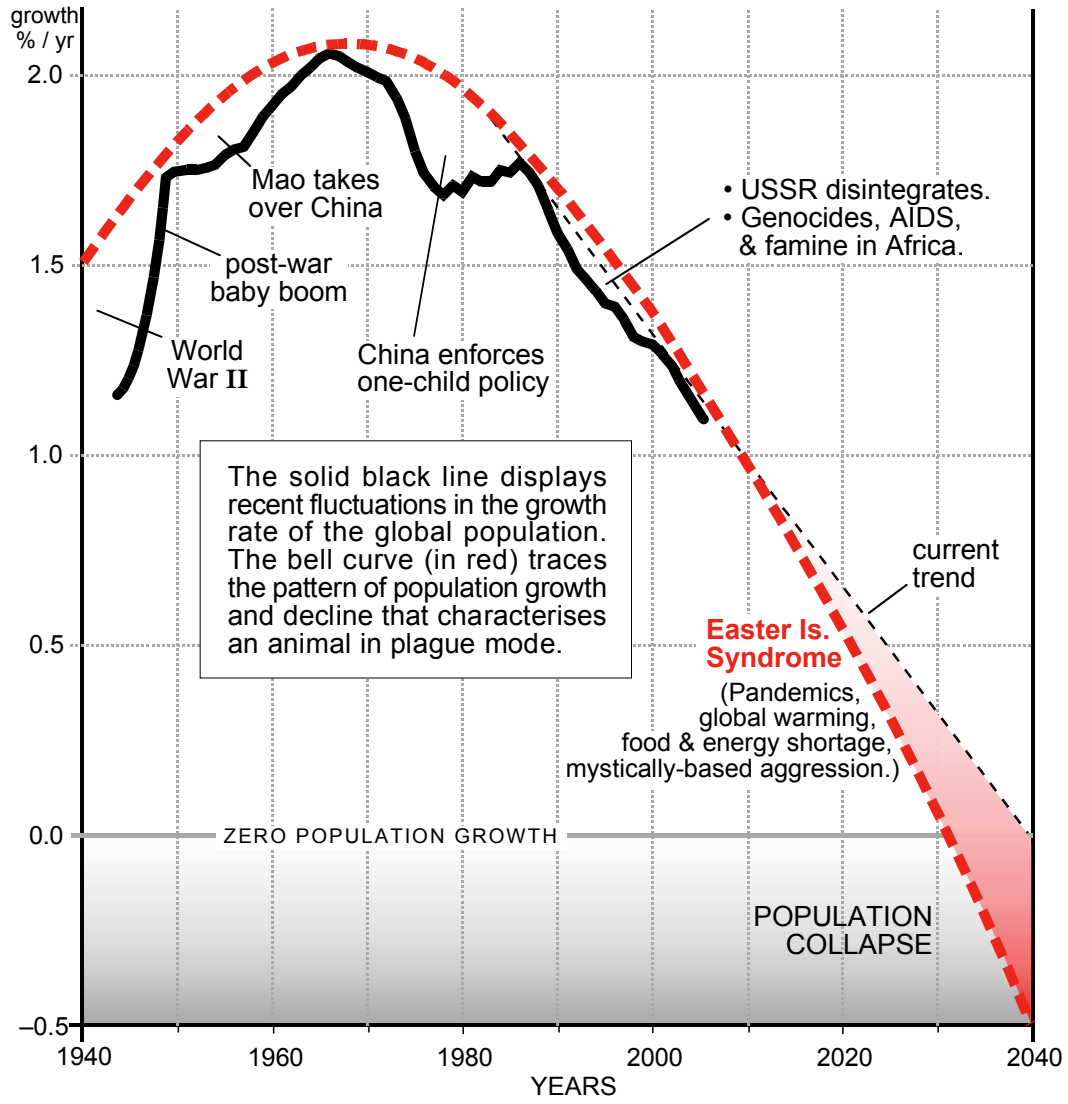




On the assumption that our species is a typical byproduct of genetic and Darwinian evolution this is the kind of graph we should expect to see. The explosive period of exponential growth between about 1800 and 1967 makes the label 'Plague Species' unavoidable.

POPULATION GROWTH

Expressed in percent per year



Based on UN data, 2004

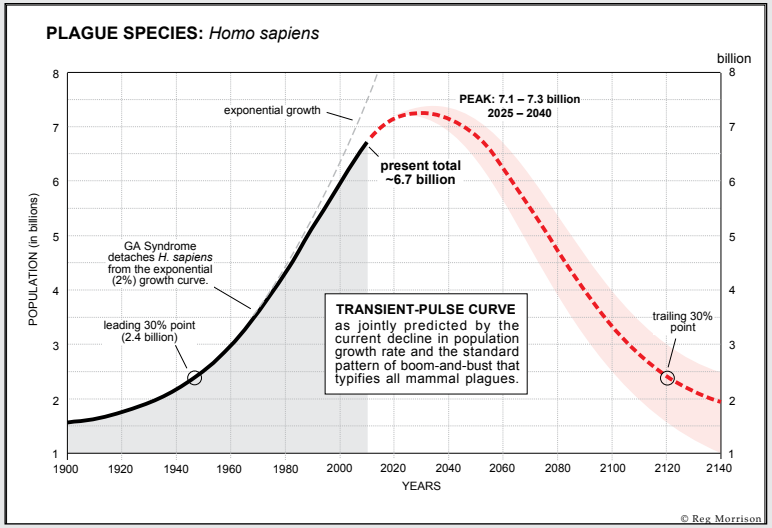
regm@optusnet.com.au

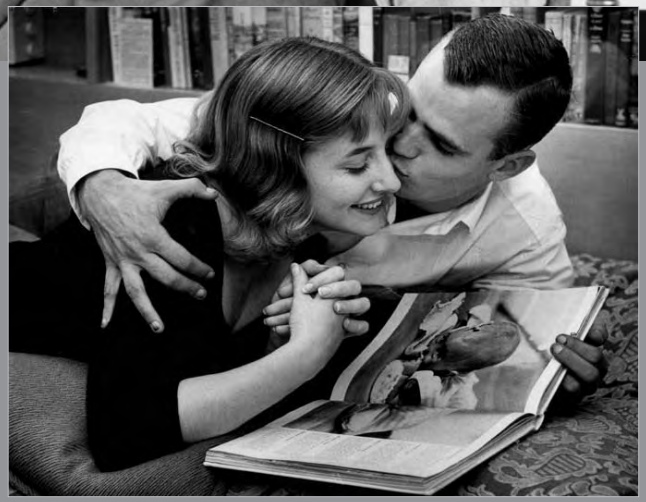
THE EASTER ISLAND SYNDROME

This is the standard pattern of exponential boom and bust that defines all animal plagues.

Our species detached itself from its exponential growth curve in the late 1960s, and so our global population should peak around 2030 at somewhere between 7.1 and 7.3 billion people.

Our continuously declining fecundity should then launch our species into an accelerating population collapse that mirrors its explosive growth phase. This is the nature of all plagues.





MYSTICISM: the illusion that separates us from all other life.

GENETIC BEHAVIOUR: the fact that binds all life together.

NOTES

MEMORIES ARE MADE OF THIS (p.9)

[1] Ian Weaver, Moshe Szyf and Michael Meaney, "Maternal care effects on the hippocampal transcriptome and anxiety-mediated behaviors in the offspring that are reversible in adulthood". *Nature Neuroscience* vol.7 p.847, 2004 (Proceedings, National Academy of Sciences.)

[2] Courtney Miller and David Sweatt."Covalent Modification of DNA Regulates Memory Formation", *Neuron*, Volume 53, Issue 6, pp.857-869, 15 March 2007

EVOLUTION OF THE HUMAN BRAIN (p.11)

[3] Benjamin Libet, a Californian neurophysiologist, demonstrated in the 1990s that the brain starts responding to an external command about 500m/sec before a person makes a conscious decision, suggesting that free will is a rationalization produced by the mind after the fact to explain its actions. As a result of this research he was awarded the very first Nobel Prize for Psychology in 2003. Libet summarized his research in the 2004 book "*Mind Time: The Temporal Factor in Consciousness*."

See also: Peter Halligan and David Oakley, "The Greatest Myth of All", *New Scientist*, 18.11.2000, pp.34-39.

MECHANICS OF DELUSION (p.13)

[4] Richard F.Thompson, *The Brain*, 1985, pp.19-21.

OUR SPLIT BRAIN (pp.14-15)

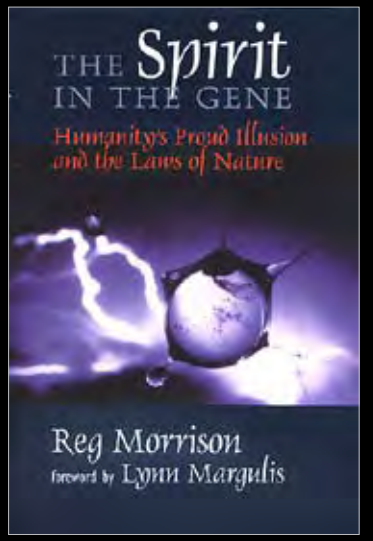
[5] R.W. Sperry, "Lateral specialisation in the surgically separated hemispheres." *Neurosciences: Third Study Program*, 1974, pp.5-19.

(Sperry was awarded a Nobel Prize in 1981 for his work with split-brain patients.)

[6] Anne Moir and David Jessel, *Brain Sex* (1989) 1992, pp.39-49.

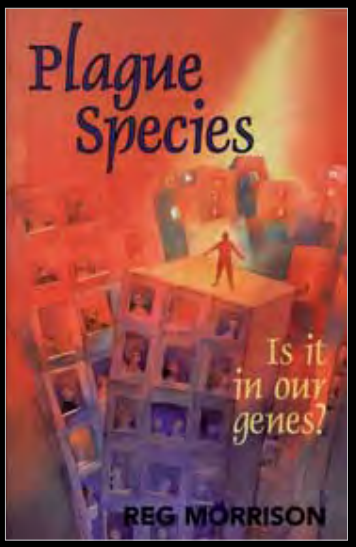
[7] Michael Gazzaniga, "The Split Brain Revisited", *Scientific American* 1998, pp.35-39. See also M.J. Tramo *et al*, "Hemispheric Specialisation and Interhemispheric Integration", in *Epilepsy and the Corpus Callosum*, 1995.

"***Evolution's Problem Gambler***" is based on, and also contains extracts from ***The Spirit in the Gene***. (Cornell University Press, New York, 1999.)

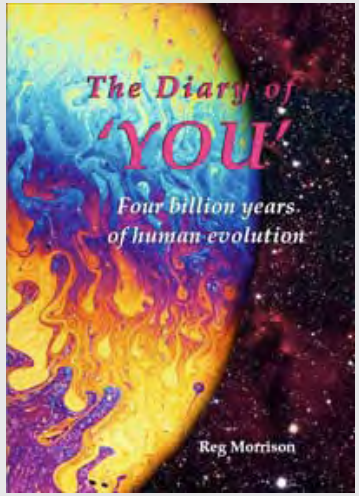


The book summarises the massive impact that humans have had on the biosphere, and explores the evolutionary origins of the behaviour that produced this impact.

This book was revised and republished in 2003 by Reed New Holland, Sydney, under the title ***Plague Species: Is it in our genes?***



Biographical note



Originally a West Australian, Reg Morrison is now a Sydney-based writer-photographer who, for the past 25 years, has specialised in environmental and evolutionary matters. His latest book, ***THE DIARY OF 'YOU': Four-billion-years of human evolution,*** explores the evolution of the essential cellular features and chemical pathways that now manage our daily lives. The momentous evolutionary events that produced them are here compressed into twelve dramatic 'monthly' installments that offer a new kind of biology resource for students and a springboard for teachers in Australian High Schools. (Sainty & Associates, 2008)

A companion work, ***Australia's Four-billion-year Diary,*** similarly compresses the evolution of the continent into 12 'monthly' episodes, that are accompanied by references to the biological significance of those evolutionary events. It is primarily designed for High School teachers and students doing Earth and Environmental Science. (Sainty & Associates, 2005)

By the same author:
Australia, Land Beyond Time, New Holland Publishers, 2002
(original title: ***The Voyage of the Great Southern Ark***, 1988).
The Great Australian Wilderness, Phillip Mathews Publishers, 1993.
Australian's Exposed, Paul Hamlyn, Sydney, 1973.