

The Enigma CODE

&

the 'Spirit' in the Gene

Reg Morrison



Morality
Free will
Culture
Religion
Sexuality

(a few unmentionable facts)

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The Silt of Dreams

*We come crying into this world,
the fine, warm silt of innumerable dreams ...*

*We come, heavy with the peculiar instincts of our blended origins,
the summers and winters of those regions
and the restless ebb and flow of their peoples.
But baby scales show nothing of this.*

*We come bulging with potential and gaping with the flaws of our
particular genetic heritage, and it is never 'a Normal Birth'.*

*We cry out, "Look! I am different from all before—I am ME!"
But the name-tags on our wrists and the cards, forms and computers
that register our arrival make no mention of it.*

*And yet, with that first cry, our species is born afresh on this opulently
appointed planet and once again begins its age-old struggle
for genetic survival.*

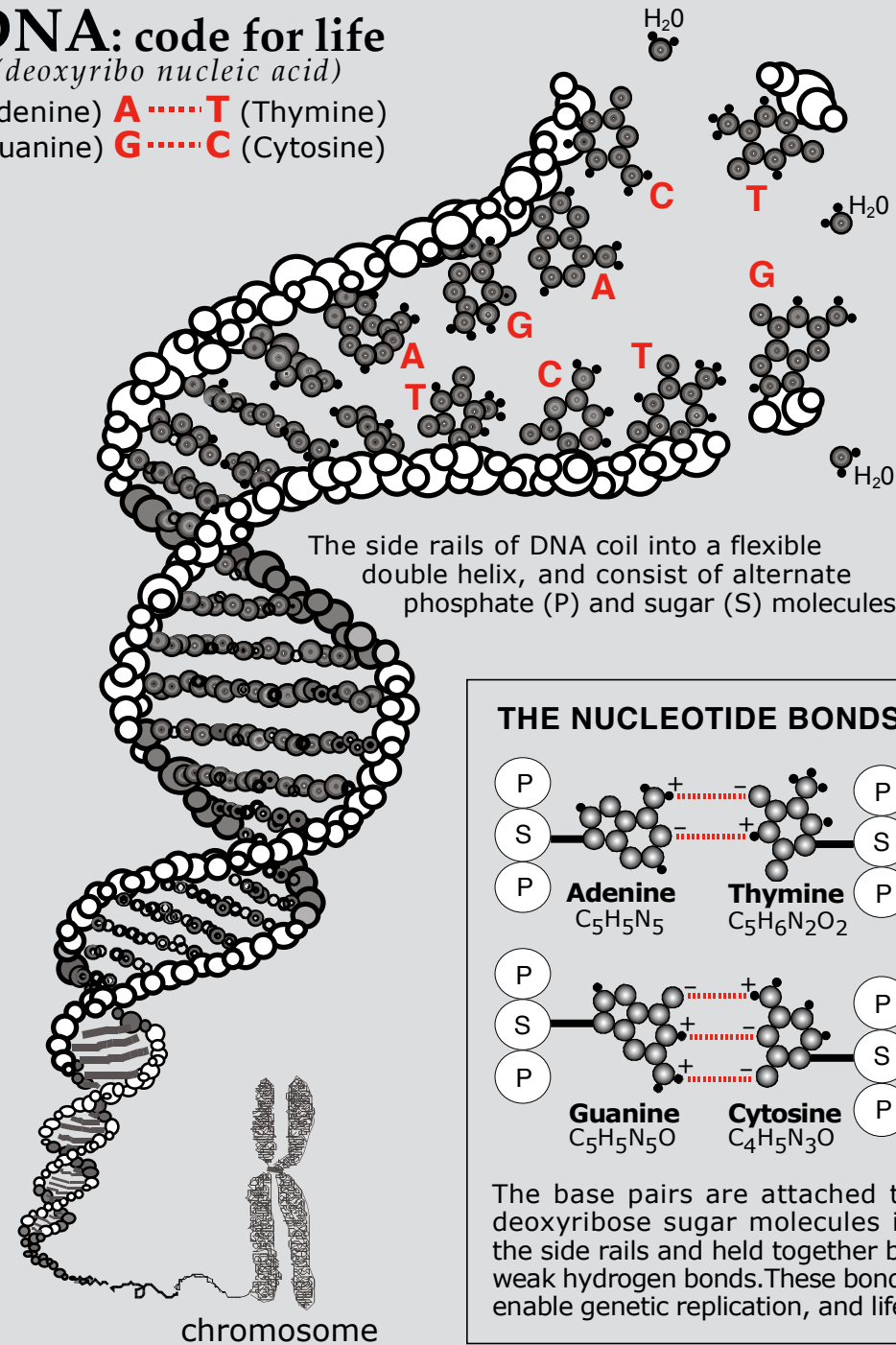
Enigma Variations

There are some 20–30 million species of organism sharing the planet with us, all of them shaped and driven by their genetic material. The factors that distinguish one species from another are determined by relatively minor differences in the sequence of chemical 'letters' that constitute their particular genetic code. Those chemical letters, the nucleotide bases that link the two strands of the DNA helix together, not only determine the general behaviour of the particular organism but also determine how the organism will react to its environment and to the stresses that it must face during its lifetime.

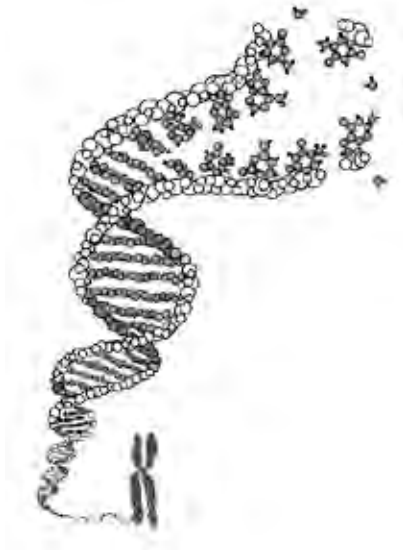
As one of Earth's 20-30 million species, inevitably, the same rules apply to us.

DNA: code for life (deoxyribo nucleic acid)

(Adenine) **A** **T** (Thymine)
(Guanine) **G** **C** (Cytosine)



The ‘Spirit’ in the Gene



- The twin strands of DNA are held together by weak hydrogen bonds, and this ‘weakness’ is the crucial factor that allows it to zip and un-zip repeatedly in order to yield protein and to replicate itself. It is hydrogen’s weak bonds that make DNA the sole recipe for Life.
- Since DNA’s unique talent resides in its ability to replicate, life has only one basic imperative: to reproduce. But reproduction requires energy and demands survival. In order to harvest sufficient energy and survive long enough to complete the reproductive process, life must insulate and equip itself for its particular environment. Behaviour is the strategy that each species uses to achieve these ends.
- All the biological evidence indicates that we are a typical byproduct of the evolutionary process, and our behaviour is essentially distinguished by our talent for complex communication and our innate fondness for abstract concepts—especially those that bind us into groups.
- The human cortex quadrupled its surface area during the past three million years, enabling the high-speed parallel processing of incoming data. This allows us to blend and compare it with archival material on a semi-continuous basis, engendering a continuous awareness of our own existence and a unique capacity to juggle abstract concepts.
- Such self-awareness induces us to believe that we have wrestled the decision-making process from our primate genes, and transferred it to the rational cortex in the frontal lobes of the brain. We believe that this neuronal power shift occurred more than 30,000 years ago and now enables us to override our ancient genetic imperatives—our ‘animal instincts’. It’s a feature that supposedly distinguishes us from all other species.
- Yet brain-scan imaging suggests otherwise. In response to any stimulus the brain’s core structures light up about 500 milliseconds *before* the rational cortex, which suggests that the parliament of genes sitting in the ancient basement of the brain previews the incoming data to decide what is ‘good’ or ‘bad’ for our immediate evolutionary circumstances. It then transmits its judgement and its behavioural directive to the conscious cortex for repackaging in rationally acceptable terms. Should the genetic directive fail the test of logic however, it is immediately re-labelled as originating from some super-natural, mystical source. And since genes often demand ‘non-rational’ behaviour, this ability to repackage genetic directives under mystical labels has secretly hotwired most behaviour to our genes and continually saves our species from inappropriate rational thought. Here lies the human ‘spirit’ in our (primate) genes. □

(Primate)
The 'Spirit' in the Gene

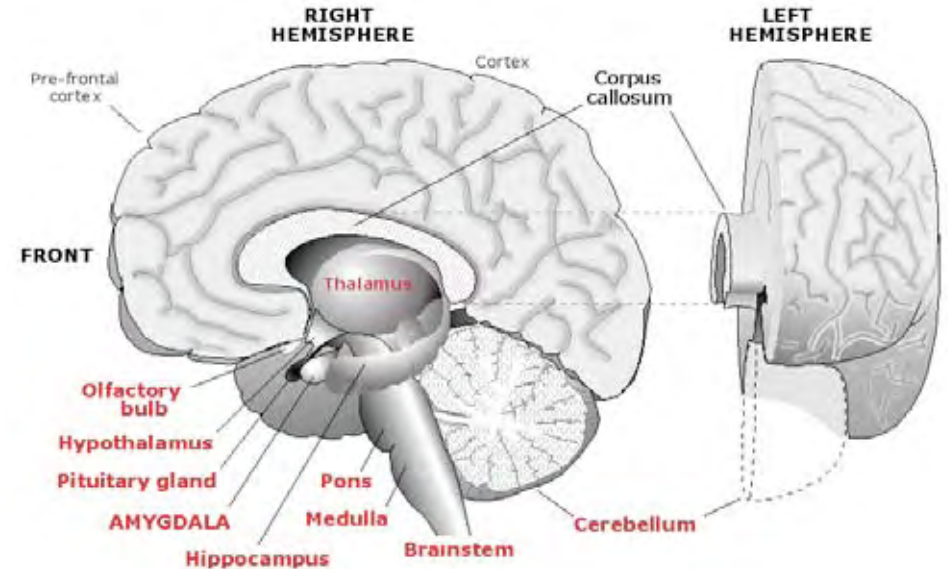


Genetic Behaviour

Most people automatically assume that they are consciously responsible for their actions. Yet our instinctive (genetically engendered) belief in the supremacy of the rational brain demands an underlying bet that should seduce only the most demented of gamblers. It is generally conceded that there are somewhere between 10 and 100 million species inhabiting this planet. The best guess is currently around 20-30 million. It is also conceded that all of these species are shaped and driven by their genetic material. So, one exception in 20-30 million? Fat chance!

Most people justify their bizarre bet on the grounds that the unprecedented growth in the surface area of the human cortex during the past three million years allowed this 'rational' region of the brain to snatch the reins of behaviour from the antique parliament of primate genes some 30,000 – 60,000 years ago. I would argue that such a take-over by our cortical neurons would have absolutely guaranteed our extinction. It would have represented a *coup d'état* by a gaggle of inexperienced neuronal amateurs. And considering the astonishing survival record of the ancient board of genetic directors that ruled unchallenged in the basement of the hominid brain, the idea that such a take-over might prove successful seems far fetched to say the least.

Indeed, repeated studies have now confirmed that it is the reptile-amphibian core of the brain (see diagram, labelled in red) that instantly lights up in response to new data and altered cir-



cumstances. The conscious 'rational brain', centred in the pre-frontal cortex, begins to fire up some 500 milliseconds later—after the board of genetic directors in the basement have had time to assess the incoming data for any concealed threats to their security and survival. If threats are implicit in the data, the parliament of genes overwhelms the rational brain with a flood of emotion and issues a set of directives for well-proven genetic behaviour. So emotion is the flag of genetic behaviour and signals that the rational brain has been bypassed in the interest of long-term genetic survival. If our Amygdala has been triggered, we react 'instinctively' with anger, lust or fear. If not, then we think and act 'morally'—out of love, duty, or a sense of justice and compassion. Meanwhile the brain's propaganda department patches together a reasoned explanation for that behaviour in order to maintain a reassuring facade of rational 'free will'. □

Genetic Behaviour



Autistic boy, Sydney, NSW.



Sydney, NSW



Political skirmish, Perth, WA.

The Moveable Feast

Genes ‘code for’ neither structure nor behaviour. The only thing a gene does is replicate and yield protein. On the other hand, a particular protein sequence prescribed by a particular parliament of genes may indeed result in structures and behaviours that contribute to the long-term survival of that genome. These structures and behaviours are therefore emergent properties that combine to produce the spectacular phenomenon we call a species — whose members reproduce fractally, reiterating their general structure and behaviour from generation to generation.

Since all other species are wholly shaped and driven in this fashion by their DNA, we must assume that we are too, and that every aspect of our behaviour is similarly genetic in origin. Because of this however, the enlargement of our rational cortex during the past three million years would have presented our ancestors with a very dangerous dilemma indeed. The behaviour prescribed by their newly enlarged rational cortex would have clashed very often with the well-trying patterns of behaviour prescribed by their ancient parliament of genes, so they would have been repeatedly forced to make the most fearful of choices.

Imagine a group of hunters facing a large predator; each rational brain screams: ‘Run for your life!’ But then our genetic dictatorship steps in: ‘Stay together and fight for the sake of your hunter-comrades, your family and your tribe!’ Since tribal groups share

most of their genes, what their genes are really fighting for is the survival of their alleles*. And since our very experienced primate genes generally offered the best behavioural recipes for their own long-term survival through time, such altruism was the genetic behaviour that survived best, although its genetic origins remained hidden behind a thick smoke-screen of emotion and cultural propaganda about ‘comradeship’ and ‘heroism’.

Meanwhile, as the female birth canal continued to shrink due to bipedalism, it meant that only under-developed, ‘premature’ offspring could negotiate the narrow exit without brain damage. And as babies became less competent, nurture and protection by parents, relatives and the whole tribe became even more important for their survival; so powerful cultural dogmas evolved to reinforce those bonds too.

There were times, however, when the hormones, enzymes and neurotransmitters that contribute in various ways to tribal cohesion would come into conflict with each other, as well as with the primal imperative to survive and reproduce. Hence the conflicting philosophies, moralities and public rituals that make up modern culture. Hence marriage and divorce; hence the public adulation of ‘heroes’, and the humiliation and execution of its ‘villains’. Nothing really new here, just primate imperatives put through the Darwinian wringer and taken to extraordinary extremes. Should you need confirmation of this, just turn off the deafening cultural sound-track, and humanity’s good, honest, apeish heritage will shine reassuringly through. □

* ALLELE: A copy of a gene that exists in other genomes.

The Moveable Feast



Anti Vietnam-war rally, Perth, WA.



'Stolen generation', Perth, 1965.



Anzac march, Sydney, 1989.

Our Beautiful Illusions

Illusions play a central role in our lives and provide almost all of our emotional ‘highs’ and ‘lows’. Most of those illusions can be filed under the general heading of Culture, and they are virtually impervious to uncomfortable facts—facts that should fatally damage such flimsy mental phantoms if they did not enjoy genetic protection. Yet our ancient tribal illusions survive unscathed, even in this supposedly rational era.

Central and most cherished among those illusions is the belief that we have acquired ‘Free will’, and thereby, the capacity and responsibility to make rational choices about all aspects of our behaviour. This belief also persuades us that we exist on two levels, the physical level, and the mental or ‘spiritual’ level. Our ready acceptance of this existential duality then provides us with a raft of other useful illusions, including that most dangerous perception of all: that we are ‘more advanced’ and fundamentally distinct from other species.

The concept of ‘Free will’, plus the raft of behavioural by-products that we now classify under the imposing heading of ‘Morality’, would have been selectively installed and enhanced as our hominid ancestors struggled for survival on the drying plains of East Africa during the early onset of the present glacial era some 5–7 million years ago. These illusions would have provided the key ingredients for the tribal cohesion and altruistic cooperation that saved our particular species from extinction when the seasonal savagery of the present glacial era finally arrived.

The best way to preserve an illusion from destruction by fact is to embed it in religious beliefs. Reinforced by a set of ‘divinely’ sanctioned behavioural expectations, such useful illusions would have embedded themselves deeply within *Homo erectus* tribal groups, ensuring that almost all members behaved altruistically and in unison, especially when they came under threat from predators or tribal competitors.

Fortified by gaudy cultural events, such as rights-of-passage, marriage and funerary rituals, as well as religious, political and sporting ceremonies, a society’s ‘Culture’ becomes its protective shield. So strong were these behavioural fortifications in tribal times that most of them survived the traumatic social switch from being hunter-gatherers to living as farmers and traders. Without the ubiquitous concepts of ‘free will’ and ‘responsibility’, for example, we could not discipline and educate our children and all semblance of cultural order would collapse.

Yet, as has been shown, rational ‘morality’ is an illusion. Behavioural decisions that affect our survival and reproduction (the only decisions that really matter) are made unconsciously during the 500 milliseconds that elapse between the arrival of sensory data and the firing up of our conscious cortex. Here is the mental crevice that conceals humanity’s ‘indomitable spirit’. No one knows the real ‘Me’, not even me, the writer of these words. For the real Me is spelt out in just four letters, ATGC, but they’re arranged in a wholly unique sequence, three billion letters long. It’s a sequence that has never existed before and will never appear again. Here is a Me that no other human can ever know or control. □

Our Beautiful Illusions



Seance, Perth, 1962.



Stations of the Cross, Sydney, 1972.

More Beautiful Illusions:

Modern culture is also founded on four ancillary illusions:

1. Biological evolution ‘progresses’ towards intelligence.
2. Humans represent the pinnacle of biological evolution.
3. Morality and culture are expressions of our growing wisdom.
4. Having broken free from the genetic and environmental constraints that restrict the behaviour of other species, we now possess virtually unlimited potential.

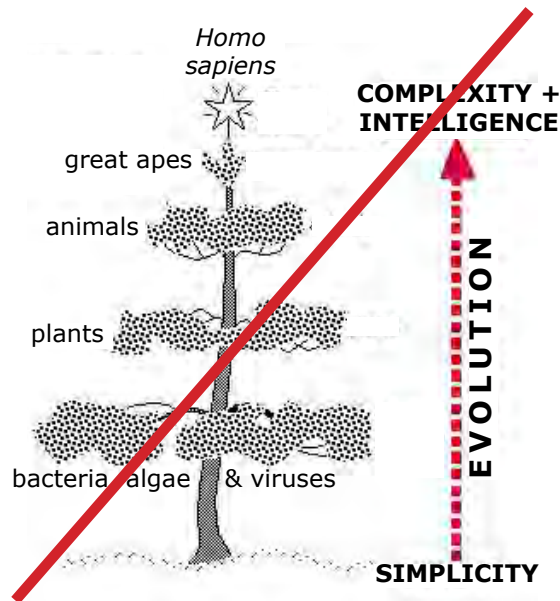
By contrast, the facts are:

1. Evolution does not ‘progress’. It merely diversifies (see diagram overleaf).
2. The tree of life is not a pyramidal Christmas tree, with bacteria at its base and *Homo sapiens* the evolutionary star at its apex. The tree is flat-topped and expresses the biota’s breathtaking diversity at this mid point in the life of our solar system. This diversity continually increases as new species tap into energy sources that lie beyond the reach of their predecessors; and in order to reach past those predecessors, new species are forced to become more complex (see diagram). Neither is our brain enlargement evidence of ‘evolutionary progress’. It too, is an artifact of life’s middle-age spread and the complex by-product of a peculiar sequence of environmental crises that overtook our hominid ancestors during the past five million ice-age years.
3. An erect stance produced a constriction of the hominid birth

canal and enforced the production of small, underdeveloped offspring. Such incompetent babies would have survived only in very cohesive families within a very protective, altruistic tribal framework that was tightly constrained by powerful carrot-and-stick social reinforcements—by ‘culture’ and ‘morality’. So culture, with all its attendant mystical restraints, represents a genetic counter-measure to the shrinkage of the human birth canal and to the subsequent growth of the human cortex. The surface area of the cortex has quadrupled in the past three million years—partly because most of our brain’s neuronal network develops AFTER we have negotiated the narrow birth canal. During this extended developmental period we are subjected to intensive education by parents and teachers in order to prepare us for independent survival; and inevitably, our neuronal network grows vigorously in response to the sustained barrage of stimuli. The product is an animal that soaks up culture like a sponge and is inordinately malleable in a social sense. Significantly, all our cultural constraints—morality, duty, justice, etc.—are invariably attended by, and generate, powerful emotions. And as we have seen, emotion is the signal that our genes are taking control of our behaviour in order to protect themselves from the gene-threatening inadequacies of rational thought.

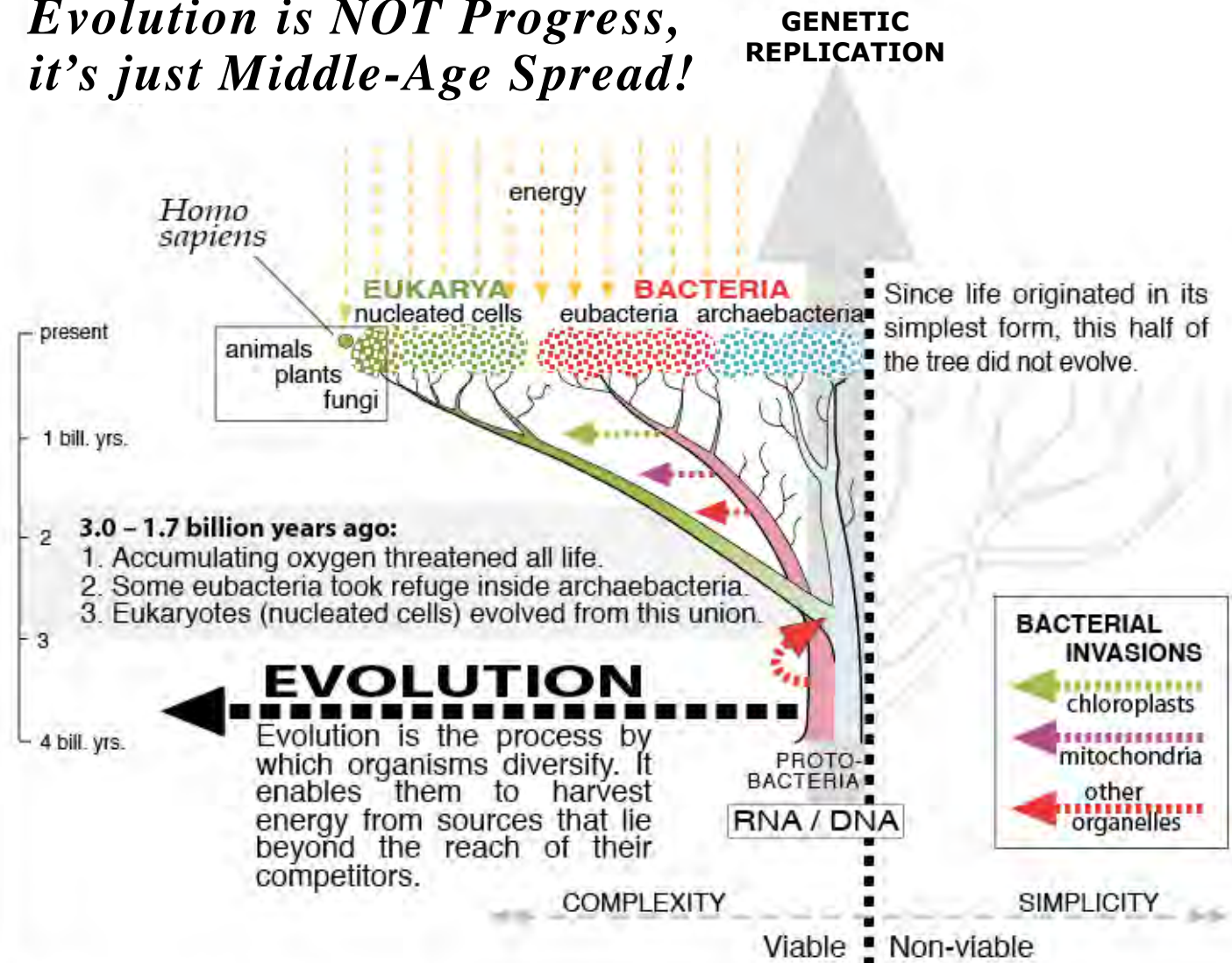
4. This is a bacterial planet and we are bacterial constructions—exotic fringe-dwellers on Earth’s vast tree of bacterial life. Each of us constitutes a gigantic nation of bacteria, and our particular kind of bacterial nation is the most energy-hungry of all. Therefore we are also the most vulnerable of all, existing as we do at the very limit of evolution’s middle-age spread.□

Our Beautiful Illusions



The anthropocentric view of life (ABOVE) is essentially a by-product of agriculture and is probably around 8,000 years old. It would have arisen as we learned that we could manipulate the environment to some extent and could generate and store our food sources by planting grain and domesticating certain prey species. By contrast, most hunter-gatherers were far too aware of the interdependence of all species for them to fall for such a simplistic concept.

Evolution is NOT Progress, it's just Middle-Age Spread!



Suspension of Disbelief

There is an intriguing mental device that our genes use whenever they want to squeeze our perception of reality into a shape that better suits their needs. It prevents our rational brain from recognising and discounting fanciful data whenever belief in that data might massage our genetic buttons in a satisfying fashion. The device might well be called ‘suspension of disbelief’.

Like the ‘hot-wire’ that a car thief uses to fire up the motor when he has no key, Darwinian evolution has retained the ancient hot-wire that links our senses directly to our genes. This primordial connection allows us to switch instantly to genetic responses in emergency situations, thus by-passing our inexperienced and error-prone rational cortex. This is our genes’ standard strategy whenever they come under threat. And that ancient genetic hot-wire also has an astonishingly wide variety of every-day uses.

The world of entertainment, for example, utterly depends on ‘suspension of disbelief’, since this enables us to believe in the fictitious characters and events that are portrayed as real on stages and screens around the world. This evolutionary device cuts in the moment a fictional character or event touches one of the multitude of mental buttons that are linked to our genetic imperatives to survive and reproduce. Touch one of those buttons and a stew of hormones and neurotransmitters flood the body and brain generating a rush of emotion that switches out the rational

cortex, and brings rational assessment to a halt. The imagination fires up, transforming fantasy into ‘reality’, and in that extraordinary instant almost anything becomes mentally possible. In that bizarre moment even the most mundane event may be transformed into something ‘divine’.

Here is our genes’ secret weapon in their age-old struggle to survive and reproduce in a hazardous and unstable environment. Here is the shrewd old genetic midwife that delivers passionate belief in the patently ridiculous—in witchcraft and spells, in gods, miracles, angels and devils; in the validity of religious dogma, economic growth and astrological predictions; in sustainable development, ‘market forces’ and martians. Here is the device that sanctifies and bestows peculiar significance on ‘the home team’, ‘the Party’, ‘the Church’, and ‘the Flag’, thereby bonding us into families, tribes, nations, religions and ethnic groups; into teenage and criminal gangs, and into political parties and their childish factions.

It is this extraordinary ability to suspend rational assessment and switch to emotional behaviour that enables us to reject uncomfortable scientific data and rely instead on mystical cultural dogma. As our social stress levels grow, so our ‘suspension of disbelief’ encourages our global drift towards religious, ethnic and political extremism. And this ancient genetic device will keep us mystical and largely oblivious to the awesome threat of extinction that faces our species as it slides headlong into resource depletion, climate change and population collapse. □

Suspension of Disbelief



Sydney, 1973.



Perth, 1965.



Canberra, 1972.

Sydney, 1973.

For God and Family Values

“The National Government ... will preserve and defend those basic principles on which our nation has been built. It regards Christianity as the foundation of our national morality, and the family as the basis of national life.” (Adolph Hitler, Berlin, February 1, 1933.)

Duty, honour, justice, and a firm belief in ‘God and family values’... Leaders, both religious and secular, have thundered their approval for such attributes throughout history. Yet history shows just how malleable those ‘timeless values’ really are.

Founded on such morality, the Medieval Crusades generated only tides of blood and tears that surged through Europe and the Middle East at least nine times during the 11th, 12th and 13th centuries. Some eight centuries later, in 2003, Al Qa’eda’s leaders were still able to trade on that old wound by luring the leaders of America, Britain and Australia into new Crusades in Iraq and Afghanistan. So now, thanks to jet engines and the wonders of electronic communication, those ancient tides of mystical fervour have once more harnessed the very malleable morality of fundamentalists everywhere—in the old world and the new.

But how do merciful gods and their moral minions accommodate the pitiless creed of the suicide bomber, the ‘honour-killing’ of wives in India and Pakistan, the wholesale sexual mutilation of teenage girls in sub-Saharan Africa and the indefinite caging of refugee children in Australia? Clearly, humanity’s rational neurons do very little business here. There is only one source of

such inane, emotion-charged action: our DNA. These are clearly genetic behaviours, the byproducts of modifications that were selectively embedded in the genome on the dangerous plains of east Africa during the past two million stressful years.

The genes that drive human behaviour are sub-divided into committees of protein producers that tend to work in unison. However some committees produce responses that conflict with one another. In gorilla society for example, when a new silverback male takes over a female harem he eliminates his predecessor’s genes via infanticide. Though marginally damaging to gorilla society in the short term, the behaviour is profitable for the species in the long term. Inevitably, faint echoes of this ancient genetic strategy reappear in human statistics: infanticide rates are far higher among step-fathers than natural fathers. Similarly, where male genes feel most threatened, female promiscuity is most savagely proscribed. Hence ‘honour killings’ and female ‘circumcision’. The caging of children is another symptom of genetic stress, but in this case due to overpopulation and habitat destruction. Such stresses enable simple-minded leaders like Bush and Howard to pursue policies that would once have been universally condemned as immoral and cruel. □

For God and Family Values



Aboriginal Embassy arrest, Canberra, ACT, 1972.



PHOTO: Amnesty International, 2005



Aboriginal Embassy arrests, Canberra, ACT, 1972.

Sexual Advertisements

Replication is the primary characteristic of all genetic material, so reproduction is the driving imperative of all species. The astonishing variation in the reproductive behaviour of sexual species provides eloquent confirmation of its genetic origins.

Genetic behaviour negotiates impediments to reproduction in much the same way that a river flows around boulders in its path to the sea. The larger the impediment or the more central it is in the prevailing current, the greater the deformity in the flow pattern. As typical products of evolution we too, are constrained by these rules in all aspects of our behaviour. But impede our central drive towards reproduction, and beware the magnitude of the deformity!

When our ancestors lost the shelter of the forest and became bipedal prey on the dangerous plains of East Africa, their narrowing pelvis saddled their descendants with under-developed, incompetent babies. This handicap drastically altered all social interactions that were connected with reproductive behaviour. Among these changes, two were extraordinarily significant:

1. The upright stance effectively concealed the woman's oestrus cycle. Instead of displaying blood-flushed, aromatic genitalia to all males during knuckle-walking, women now had to display their receptivity by suggestive forms of behaviour or by artifi-

cially perfuming and colouring crucial areas of the body. Most commonly they added blood-flush colours to prominent display points—lips, nails, cheeks, and nipples.

2. Also, by way of physiological compensation, women became more genetically productive: with up to 400 menstrual periods in a greatly expanded window of fertility, a woman might now bear 20–30 babies. (Female chimps, by contrast, bear only 6–8 babies during their lifetime.) Fertility on this new human scale threatened the viability of the whole species. It had to be savagely curbed. The solution was to install rigid 'moral' limits to the number of sexual partners a woman could have, and similarly cramp the genetically useful promiscuity of her partner. Hence the institution of marriage, with its social reinforcements and punishments for offenders—especially female offenders. The instant sexual arousal of males by the sight of overt sexual activity, or by any outward show of female receptivity, remained necessarily intact. Hence the highly lucrative industries founded on cosmetics, female fashion and male-oriented pornography.

Unlike species that broadcast their genetic material via wind or water, as do conifers and corals, sexual species like ours have to advertise their sexual potential to achieve reproductive congress and genetic survival. So it's hardly surprising that culture largely consists of sexual displays that range from subtle to blatant. □

Sexual Advertisements

Sexual display may involve displaying physical prowess or the body itself as a badge of physical fitness for reproduction. Or it may reside in body decoration and ornaments, or in the ostentatious display of status symbols such as expensive cars and houses.



Sexual Advertisements



A G.A.S. Attack

An auto-collapse mechanism is built into the genomes of most plague-prone mammals. It appears to cut in whenever stress levels rise in conjunction with exponential population growth—just before the level of environmental damage becomes so catastrophic that it endangers large numbers of other species. This automatic culling mechanism is characterised by a particular spectrum of physiological and behavioural responses that combine to reduce the fecundity of the offending population well below its replacement level.

The Canadian endocrinologist Hans Selye, who first identified this pattern in rodents in 1936, named it the General Adaptation Syndrome (GAS). A GAS decline typically appears well before famine and disease begin to cull the population, and its hormonal ‘fingerprint’ may persist in mammal populations long after the population has shrunk to pre-plague levels and the habitat has recovered. It has even led to extinction in a few cases. Symptoms of the GAS in mammals include curtailed reproduction, increased abandonment of unweaned offspring, and an increase in dysfunctional and unproductive sexual behaviour (paedophilia, homosexuality, and inappropriate sexual display). Such behaviours are invariably coupled with higher levels of juvenile aggression, infanticide, and occasionally, cannibalism. These GAS symptoms often coincide with certain physiological malfunctions, such as inhibited sexual maturation, diminished

ovulation and implantation, inadequate lactation, glandular malfunctions, increased susceptibility to disease and a rise in infant mortality.

During his research in the 1960s and 1970s Selye identified almost the same spectrum of symptoms in humans. In more recent time, residues from the Pill and other pharmaceuticals, from pesticides, herbicides, solvents, paints and other environmental pollutants have also been shown to contribute to the general fertility decline, as have the growing number of IVF births and caesarian deliveries. These two procedures enable the fetus to avoid most of the intra-uterine selection and immunization processes, thereby ensuring that it carries a far higher percentage of genetic defects and immune-system dysfunctions than do normal births.

Sperm counts and sperm motility have meanwhile fallen significantly in all Western countries during the past three decades. In Australia, for example, sperm counts have declined by almost 30% since 1989, and similar falls have been recorded in Britain, America and several European countries. The only contradictory factors would seem to be their low level of infant mortality and the apparent lack of cannibalism. However, an increase in pregnancy termination by various medical, chemical and physical means, plus the development of blood transfusions and organ transplants clearly represents infanticide and cannibalism in a modern, ‘sanitised’ form. In other words the standard GAS is in full control and accelerating globally. □

A G.A.S. Attack



Steeleworks, NSW.



Mental dysfunction



Parental dysfunction



'Moomba', Melbourne, VIC.

Punctuation Marks

As the first shells from Saddam Hussein's armoured columns ripped into the world's largest oil refinery at Abadan on September 24, 1980, thousands of tonnes of Iranian crude began to erupt into the quiet morning air. Veined in scarlet and orange, the roiling plumes rose above the arid plains like a row of monstrous exclamation marks. As they gained altitude, the cloud tops merged and drew a black shroud over this cradle of civilization. Human folly, it seemed, was adding yet another grim comment in the margin of history.

It is now clear that Abadan's huge oil fires were indeed punctuation marks in the tide of human events, for they heralded an unprecedented global downturn in per capita energy production—a decline that has continued unbroken to this day and is now set to accelerate. Although the full evolutionary significance of that energy watershed is still unclear, there is good reason to suspect that those exclamation marks at Abadan in 1980 may have announced the terminal decline of humanity's globalised technoculture.

Modern industrial civilization is wholly dependent on fossil hydrocarbons. No renewable power source—solar, wind, tidal, geothermal or biomass can supply more than a small fraction of the world's fast-growing energy requirements, and this is likely to remain true for the foreseeable future. The combined mar-

ket share of these technologies is currently about 15%, and that percentage declines annually. About 85% of the energy presently consumed by industrial nations provides heat, light, and mechanical motion, while the other 15% powers the C3 functions—communication, computation and control. Electricity is the key. Some 42% of the world's primary energy goes into generating it, and electricity has become the indispensable end-use energy carrier of our time.

Much of the electrical energy that maintains the C3 functions depends, either directly or indirectly, on oil. The collapse of power grids in North America, Italy and Denmark show that when the C3 functions are starved of electricity, industrialized society grinds to a halt. With our oil-dependent civilization balanced on the slippery edge of energy collapse the mystics of both East and West now have the power to pull the hydrogen trigger on one of evolution's most spectacular byproducts, *Homo sapiens*.

In other words, the massive environmental bill from our past profligacy is now due, and while prospective technologies may postpone the looming energy crisis for a few years, all they will really do is add significantly to a global energy budget that is already grossly unsustainable. It seems that our hydrocarbon 'happy hour' has finally come to its natural end and our technology-based civilization is about to implode. □

Punctuation Marks

*"Our time bomb is mysticism. Its delivery system is language.
And its hiding place? The unfathomable coils of our DNA."*

The Spirit in the Gene

Armed with a lethal mixture of modern weaponry and tribal mysticism, humanity's modern hunter-gatherers will take from their neighbours the land, water, oil and food that they require in order to survive in the deteriorating environment. The coming struggles, like those between Iran and Iraq in the 1980s, between the US and Iraq in 2003, and between Israel and the Hezbollah in 2006, may begin robed in the language of high morality, but their savagery will be purely genetic—religious, bloody, and primal.

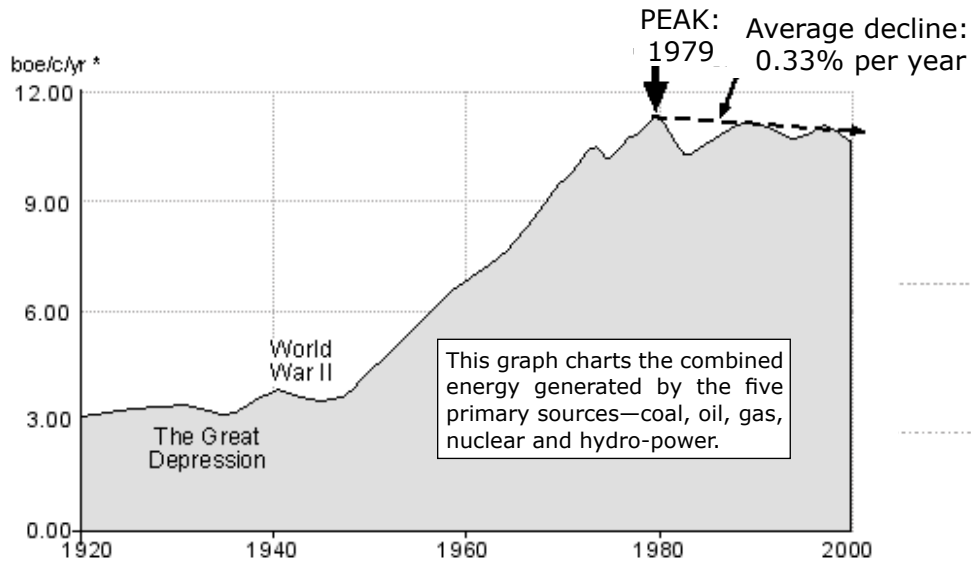


Oil installations at Abadan, Iran, 1980.
Photographer unknown

Skull: *Homo habilis*. Brain: *Homo sapiens*.

Punctuation Marks

ENERGY PRODUCTION (per capita)



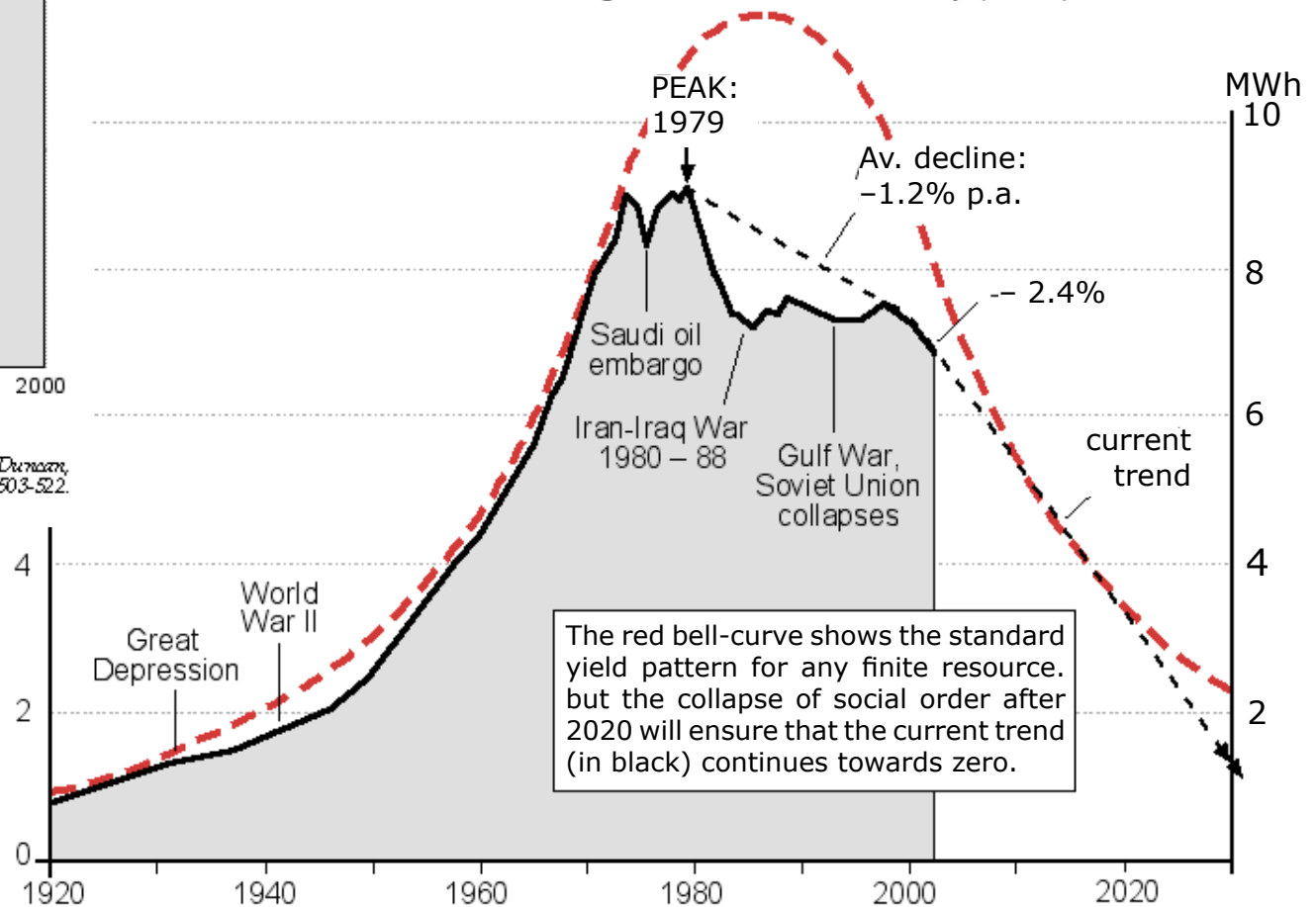
* boe/c/yr = Barrels of crude-oil equivalent / per capita / per year

Data source: Richard C. Duncan, *Population and Environment*, May 2001, pp. 503-522.

As by-products of a thermodynamic universe all species are energy dependent. They are part of the energy-dissipating machinery that helps to maintain the energy gradient between the solid, energy-rich body of the planet and the energy-poor matrix of space. It follows that any decline in the per capita energy income of our species bodes ill for all of us. Continued decline is a recipe for a quick extinction.

OIL-ENERGY PRODUCTION (per capita)

Calculated in terms of megawat hours of electricity (MWh)



Data source: Richard C. Duncan, *Institute on Energy and Man*, Seattle pers comm. 2003

Beyond Disneyland

Human society exists in a cultural goldfish bowl made entirely of mirrors. Inside the bowl all we see is a multitude of reflections, mostly of ourselves, and so we tend to think that all life revolves around our spectacularly inventive species. And according to some, so too does the universe.

In short, our lives are essentially fiction based. We read fiction novels and prefer to watch fictional dramas on stage and screen; we readily believe advertising and political propaganda, and most people place implicit faith in some form of religious, economic or political creed. So culture serves as humanity's Disneyland, a gaudy fantasy world that is specifically designed to keep us ignorant of the fact that it is our genes that call the shots, not our cortical neurons.

Outside our goldfish bowl the view is very different. The cosmos is a thermodynamic system and our fertile planet is just a tiny part of its energy-dissipation machinery. As a byproduct of genetic evolution, all life is energy dependent and rigidly bound by the laws of thermodynamics. Consequently, species that harvest either too little or too much energy risk summary execution via the normal processes of Darwinian selection. Our species is no exception. Thanks to our extraordinary talent for technology we harvest vastly more energy per-capita than any other animal of our size. And given our global popu-

lation and our current per capita rate of resource consumption, we now need three times more surface area than this small and very finite planet possesses. In short, our species is now grossly unsustainable and we are asset-stripping this cosmic Camelot in order to maintain our artificially inflated standard of living. To put it bluntly, we are on the edge of energy bankruptcy and evolutionary decline: perhaps even extinction.

'The Ascent of Man', traditionally acclaimed as a long, hard climb out of bestial ignorance, has in reality been a long, slow descent into energy debt. But bedazzled by our cultural Disneyland we have remained generally oblivious to this aspect of our existence. However, a quick glance at our population graph for the past 12,000 years reveals a typical mammalian plague spike. Judging by UN population data our plague peaked in 1967 and we are now racing towards a typically catastrophic plague collapse.

Yet we have little cause for serious complaint. We have had the very best of it. Our species' comet-like trajectory through the past 200,000 years launched us to unrivalled dominance of the planet's crust, carried us deep into space, and placed our shaky hands on the levers of life itself. It was indeed a dazzling ascent; and our return to earthy reality will be no less comet-like—fast, rough, and fiery. Surely a fitting end for such a spectacular ape. □

Beyond Disneyland



Wood-chipped rainforest, Scotsdale, TAS.



Former rainforest, Queenstown, TAS.



Desertification via overstocking, Finke, NT.



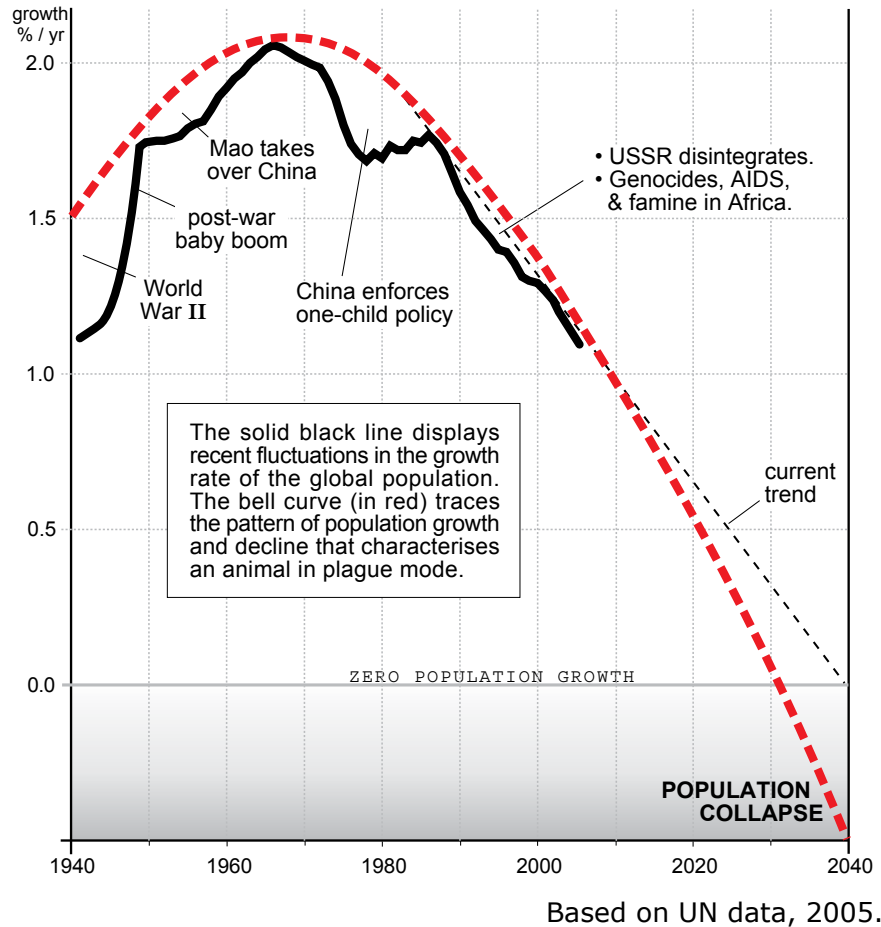
Redgum forest, L. Mulwala, VIC.



Mine pollution in rainforest, King River, TAS.

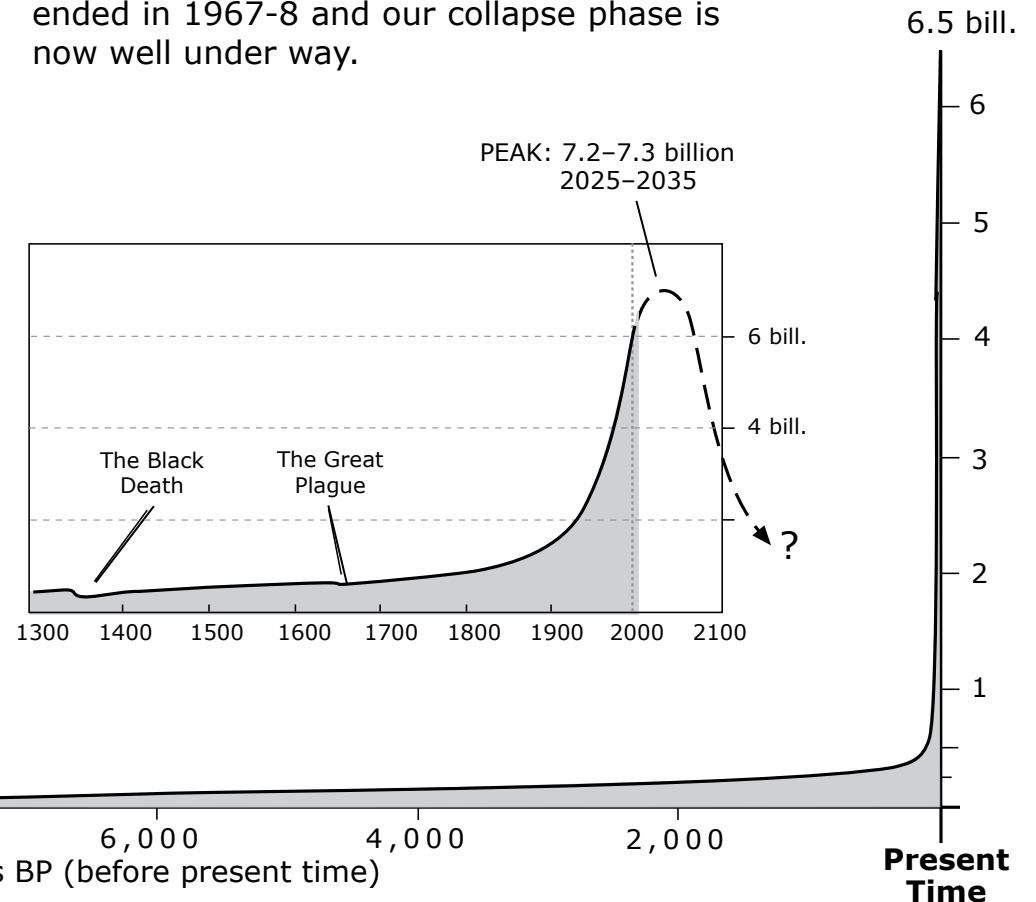
Beyond Disneyland

POPULATION GROWTH RATE



PLAGUE SPECIES: *Homo sapiens*

A species enters a 'plague' phase when its rate of population increase accelerates to the point of exponential growth, doubling itself at regular intervals. Our species grew exponentially from about 1850 to 1965, at which point its growth rate was more than 2% a year. But our exponential growth ended in 1967-8 and our collapse phase is now well under way.





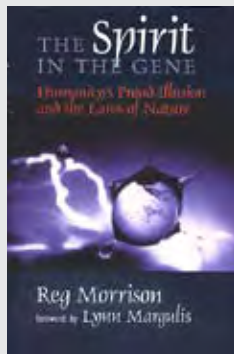
*When the evening mist rises above the rushes
and the wild duck's cry sounds chill in the twilight
I will think of you ...*

Anonymous Japanese, c 759 AD.

Biographical note

Originally a West Australian newspaperman, 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, ***Australia's Four-Billion-Year Diary***, compresses the evolution of the continent, its plants and animals, into twelve 'monthly' episodes, and is essentially designed for High School use. (Sainty & Associates, 2005)



Reg's other recent book, published in 2003 by New Holland, Sydney, under the title ***Plague Species: Is it in our Genes?***, summarises the massive impact that humans have had on the biosphere, and explores the evolutionary origins of the behaviour that produced this impact. It was originally published in 1999 by Cornell University Press, New York, under the title ***The Spirit in the Gene***.

Other books by Reg Morrison:

- 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.

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