Biocentric theology: Christianity celebrating humans as an ephemeral part of life, not the centre of it

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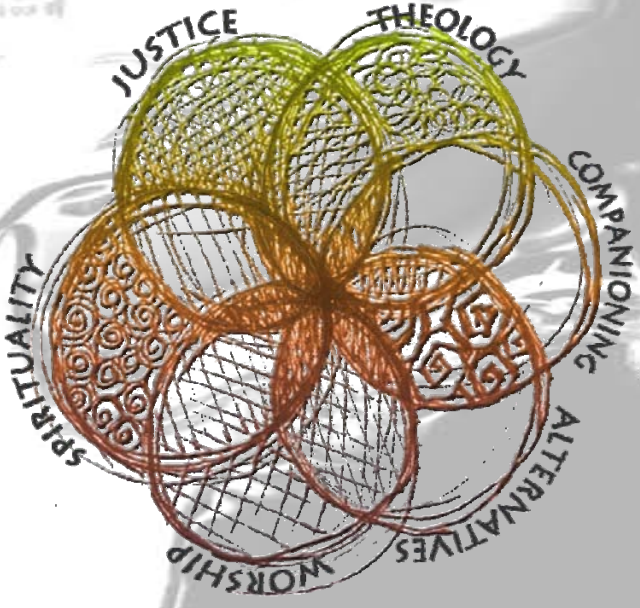

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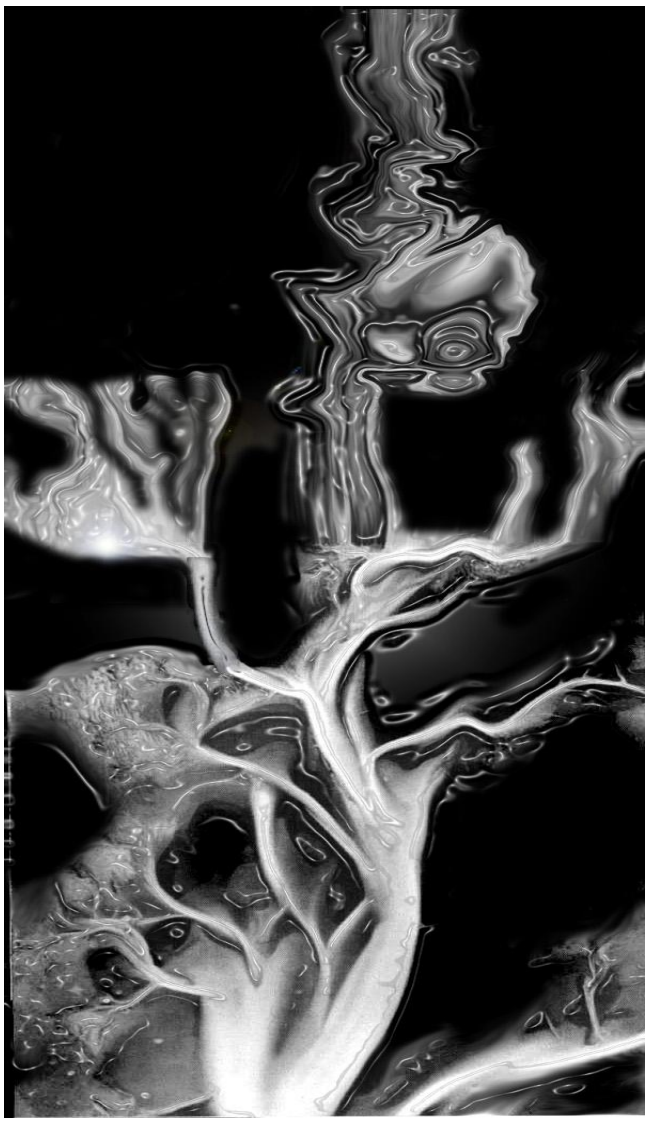
Biocentric theology



Christianity celebrating humans as an ephemeral part of life, not the centre of it

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2 Abstract

When the Uniting Church formed in 1977, its *Basis of Union* envisaged a final reconciliation and renewal for all creation, not just humans. It did, nonetheless, reflect the anthropocentric assumptions of its day, as did other official documents released in the first decade of the Uniting Church's life. Anthropocentrism assumes that human beings alone are created in the image of God, charged with dominion over Earth[1], and responsible for the fallenness of creation, though not necessarily through the actions of a literal Adam and Eve. This basic framework did not shift in the first decade, even though Earth began to be talked about not as an inanimate resource for human consumption, but something good and valuable in and of itself.

In 1990 this anthropocentric paradigm began to be challenged, and during 2000-2002 two quite irreconcilable understandings of the relationship between God and Earth, and thus humans and other animals existed side by side in Uniting Church worship resources.

Having listened carefully to the story of life as told by ecological and evolutionary scientists, I conclude that the traditional anthropocentric paradigm is no longer tenable. Instead I propose that *all of life* is the image of God, in its evolutionary past, ecological present and unknown future. *All of life* is in direct relationship with God, and exercises dominion of Earth. Evidence traditionally used as evidence of the fallenness of creation is instead affirmed as an essential part of life, though life on Earth has experienced a number of significant "falls" in biodiversity.

Even the more biocentric thought in recent Uniting Church resources is inadequate, because its language implies that life is simple, static, benign, and to some extent designed by God. In order to be adequately consonant with the life sciences, theology must be able to accept that finitude (pain, suffering and death) is a good part of creation, for without it there could be no life. This is an emphasis of ecofeminism, which I extend to affirm not only individual death, but the extinction of whole species, including humans.

I argue that the purpose of creation was not the evolution of humans, but to make possible God's desire for richness of experience, primarily mediated through relationships. Whilst this idea is well established in process theology, it must be purged of its individualistic and consciousness-centric biases to be adequately consonant with the scientific story of life.

The resulting biocentric paradigm has several implications for our understanding of Jesus. I argue that he offers salvation from the overwhelming fear of finitude, rather than finitude itself. Against the trend in ecotheology, I propose that this saving work is directed in the first instance to humans only. I tentatively propose that it is directed to only *some* humans. This, paradoxically, is more affirming of God's relationship with the rest of creation than most ecotheology, which proclaims Jesus as a global or universal saviour. Salvation for some humans, and all non human creatures, happens only in a secondary sense, because this is the only sense in which they need saving. I then speculate on whether and how it might be possible for a Christian biocentric community to live out its salvation.

Finally, I revisit the *Basis of Union* and argue that although the biocentric theology I have proposed goes well beyond the *Basis*, it is not at odds with the *Basis'* directions and intentions. Biocentric theology is, rather, an extension of the trajectories already contained within the *Basis,* with its trust in the eventual reconciliation and renewal of all creation.

[1] In this thesis I use the convention of referring to our planet as Earth, rather than earth or the earth. Some authors do this to imply that Earth is a subject, or even being. I do it simply because it seems more correct, it is the proper noun for this planet, just as I say I live in Australia, not the Australia. When quoting other authors I have retained whatever convention they used, for it is far too clumsy to change every reference.

8 The scientific stories of life

Copernicus and Darwin instigated two major revolutions in our understanding of creation. Gould claims that the Copernican and Darwinian revolutions are *the* two greatest revolutions in scientific thought. Whether that is true generally, I believe that it is certainly arguable in relationship to the impact of science on theology. Gould is also surely correct when he states that the raw emotional impact of evolutionary theory exceeds that of the new cosmology. Cosmology, as Gould puts it, speaks mainly of real estate, whereas Darwinian evolution raises questions about the very "essence" of life[320]. Ernst Mayr agrees, claiming that,

> "No other scientific theory has challenged and, in fact, refuted so many commonly held beliefs as Darwin's theory of evolution by natural selection… no other philosopher or scientists has had as great an impact on the thinking of modern man [sic] as Darwin.[321]"

Certainly Darwinian evolution is still vigorously rejected by a considerable number of Christians. In Australia in 1991, 51% of churchgoers rejected evolution and believed that Earth was created in six days. The figure was only 31% for Uniting Church attenders, but 83% for Pentecostals in the Assemblies of God[322]. Another third of Uniting Church attenders believed that Genesis and evolution could be reconciled in some way. In contrast, the cosmology which Copernicus spawned is almost universally accepted, without the need to reconcile it with the three tiered cosmology found in most of the biblical witnesses. This is, I believe, not because evolution is less scientifically persuasive, but because its implications for theology are seen to be much more far reaching.

Nevertheless, it is important to visit cosmology at least briefly, because it is able to tell us something of our place in the universe, whereas evolutionary biology restricts itself to our place on Earth.

8.1 The story of the universe

8.1.1 The scale of the universe (time and space)

Over the last 12-15 billion years, the *known* universe has expanded from probably a single point in space to a massive system 24-30 billion light years, or 144,810,000,000,000,000,000,000 kilometres across[323]. The universe contains at least 120 billion galaxies, *each* with hundreds of billions of stars[324]. Simon Driver of the Australian National University in Canberra and his team recently estimated that the number of *observable* stars in the universe is 70,000,000,000,000,000,000,000 (seventy sextillion). Two years ago I sat on a beach on Stradbroke Island wondering if there were as many stars in the universe as there were grains of sand on that beach. Just that *one* beach. Even that seemingly impossibly large number was, according to Driver, orders of magnitude too little. There are ten times more stars than there are grains of sand on the entire Earth, including beaches *and* deserts[325]. By contrast, the maximum number of stars which lead the writer of psalm eight to wonder at work of

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[320] Stephen Gould, "Introduction," in *Evolution : The Triumph of an Idea* (New York: HarperCollins, 2001), p. xi.
[321] Ernst Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist* (Cambridge: Belknap Press, 1988), p. 194. See also page 95.
[322] Peter Kaldor and R Powell, *Views from the Pews: Australian Church Attenders Speak Out* (Open Book, 1995), p. 68.
[323] Mark Wolfire, *Size of the Universe* [web document] ([accessed 6 November 2003]), available from http://www.challenger.org/tr/drjeff14.html, Edward L Wright, *Frequently Asked Questions in Cosmology* [web document] (2003 [accessed 6 November 2003]), available from http://www.astro.ucla.edu/~wright/cosmology_faq.html#DN.
[324] Anonymous, *Stargaze: Hubble's View of the Universe DVD* (Alpha DVD, 2000), DVD.
[325] Bob Beale, *Number of Visible Stars Put at 70 Sextillion* [web page] (2003 [accessed 6 November 2003]), available from http://www.abc.net.au/science/news/stories/s910295.htm. The number of stars proposed is a "media digestible extrapolation" from an original paper by Liske *et al.* which surveyed B-band luminosity (J Liske et al., "The Millennium Galaxy Catalogue: 16 <= B_{mgc} < 24 Galaxy Counts and the Calibration of the Local Galaxy Luminosity Function," *Mon. Not. R. Astron. Soc.* 000 (2003).) The number of grains of sand on earth was calculated in a very rough thought experiment (Simon Driver, Personal Communication (email), 12 November 2003.)

God's fingers was about two thousand[326]. Whilst the biblical witnesses often attest the inscrutability of God[327], the magnitude of this inscrutability is only now becoming apparent.

How was this massive universe created? Nobody know the exact details, but we do know that the physical processes with extremes way beyond human experience. The universe from its beginnings experienced winds of tens of *millions* of kilometres per hour, and temperatures in excess of a *million* degrees Celsius[328]. Such was the nature of creation that life had no possible chance of establishing itself for the first billion years of turmoil. From the stars that formed there were eventually spawned planets such as our own. Then the planets either spawned, or captured, moons for themselves. Our moon was formed when a gigantic comet collided with Earth[329], creating a massive exit wound.

Recent information from the Hubble Space Telescope suggests that spawning of planets was a common event, and that planets are ubiquitous throughout this really, really, *really* enormous universe[330]. Driver and others are confident that at least a tiny fraction of these planets would be able to support life, but that the vast distances involved mean that we will never see even traces of it[331]. Mayr explains in greater detail the reasons against ever expecting to contact extraterrestrial intelligence[332]. If there is other life in the universe, it may be much more ancient than life on Earth, since planets started forming within a billion years of the Big Bang[333]. We also know that at least some of these planets will exist long after ours is gone. Our solar system will become uninhabitable in about 4,500,000,000 years. Biological life as we know it could probably survive in the universe for another 100,000,000,000,000 years[334].

So we have seen something of our tiny place in this really, really, *really* big universe with its countless planets, which existed for billions of years before humans arrived and will continue for *trillions* of years yet. Earth is a miniscule part of God's creation.

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[326] This is the maximum number of stars observable with the naked eye at any one time from any one place on earth, (Anonymous, *Star* (Microsoft Encarta Online Encyclopedia, 2004 [accessed 4 October 2004]), available from http://uk.encarta.msn.com/encyclopedia_761557483/Star.html.) The total number of stars visible by the naked eye from earth is only five thousand (Beale, *Number of Visible Stars Put at 70 Sextillion*.)

[327] For example Job 38-41; Romans 11:33-34; 1 Cor 13:12.

[328] Anonymous, *Stargaze: Hubble's View of the Universe DVD*. There are more italics in this section on cosmology than anywhere else in this thesis, and perhaps more than literary convention would suggest desirable. If the numbers involved sink into our consciousness, however, I do not see what alternative there is. Indeed, bold italics in a larger font are probably required, but I have resisted the temptation. Edwards quotes 10 to the power of 32 Kelvin as the initial temperature of the universe, but provides no reference (Denis Edwards, *Creation, Humanity, Community: Building a New Theology* (Dublin: Gill and Macmillan, 1992), p. 35.)

[329] Initially a ring of fragments was created, which gravitated towards each other and formed the moon as they cooled (Martin Leipzig, *From Earth to Moon* [internet] (1999 [accessed 30 May 2003]), available from http://www.skeptictank.org/hs/lomarty.htm.)

[330] Anonymous, *Stargaze: Hubble's View of the Universe DVD*.; Beale, *Number of Visible Stars Put at 70 Sextillion*.

[331] Beale, *Number of Visible Stars Put at 70 Sextillion*.

[332] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 67-74. His arguments against *contacting* extraterrestrial life are still valid, even though his expectations of the *existence* of alien life forms is too conservative. He suggests there may be hundreds of millions of stars in the universe, not 70 thousand million, million, million.

[333] A popular article on this discovery is John Noble Wilford, *Hubble Telescope Detects Planet Formed 13 Billion Years Ago* (2003 [accessed 24 November 2004]), available from http://www.nytimes.com/2003/07/10/science/space/10CND-PLAN.html.. This is based on the original one which appeared in science (Steinn Sigurdsson et al., "A Young White Dwarf Companion to Pulsar B1620-26: Evidence for Early Planet Formation," *Science* 301, no. 5630 (2003).)

[334] Michelle Thaller, *The End of the Universe in Two Poems* (2002 [accessed 23 November 2004]), available from http://www.csmonitor.com/2002/0829/p25s02-stss.html. At this time, all suns will have run out of hydrogen to burn, and physical life as we know it will be impossible. The final collapse of all matter into black holes, which signals the end of physical life as we can even imagine it, will not occur for approximately $10^{10,000,000,000,000

What happens when we shift our focus to Earth itself, and the place of humans on it? Just as Earth is far from the centre of the universe, we discover that humans are far from being the central players on Earth. I begin by exploring that fact simply in terms of how long life on Earth has existed without us.

8.2 The story of Earth

8.2.1 The time scale of life on Earth

Our solar system made a relatively recent appearance in the universe, approximately 4.5 billion years ago (bya)[335]. Life on Earth appeared even more recently, about 3.85 bya. Muscled invertebrates appear in the fossil record about 550 million years ago (mya)[336]. The first vertebrates did not leave the oceans until 320 mya, and mammals only became a significant force on the planet following the extinction of all dinosaurs except birds 65 mya[337].

The first hominids[338] may have appeared about seven million years ago, and the first representatives of the genus *Homo* appeared perhaps 2.4 mya[339]. Although the exact details of hominid evolution are controversial, the following figure from Richard Southwood appears to be fairly representative (figure 1)[340].

[335] Mark Wolfire, *Age of the Sun* [web document] ([accessed 6 November 2003]), available from http://www.challenger.org/tr/drjeff1.html. Also Chris Stassen, *The Age of the Earth* (1997 [accessed 6 November 2003]), available from http://www.talkorigins.org/faqs/faq-age-of-earth.html.
[336] Carl Zimmer, *Evolution : The Triumph of an Idea* (New York: Harper Collins, 2001), p. 67. A growing body of scientific thought suggests that this universe may be simply the latest in a cycle of expansions and contractions, so that the beginning of creation may be hundreds of billions, or trillions of years ago, or perhaps an infinite number of years ago. The orders of magnitude in the universe we know are staggering enough to suffice for this thesis.
[337] Ibid, pp. 70-71.
[338] (Richard Southwood, *The Story of Life* (Oxford University Press, 2003), p. 216.) The term hominid underwent a shift in meaning around 2000, the details are irrelevant for this thesis, but a summary is contained in Lee Berger, *Viewpoint: Is It Time to Revise the System of Scientific Naming?* (December 4 2001 [accessed 5 October 2004]), available from http://news.nationalgeographic.com/news/2001/12/1204_hominin_id.html.
[339] Ian Tattersall, "Once We Were Not Alone," *Scientific American* 13, no. 2 (2003): p. 23, Zimmer, *Evolution*, p. 265. Also Southwood, *The Story of Life*, p. 220. Southwood acknowledges that some experts dispute the inclusion of *H. rudolfensis* and *H. habilis* in the genus *Homo*.
[340] Southwood, *The Story of Life*, p. 219.

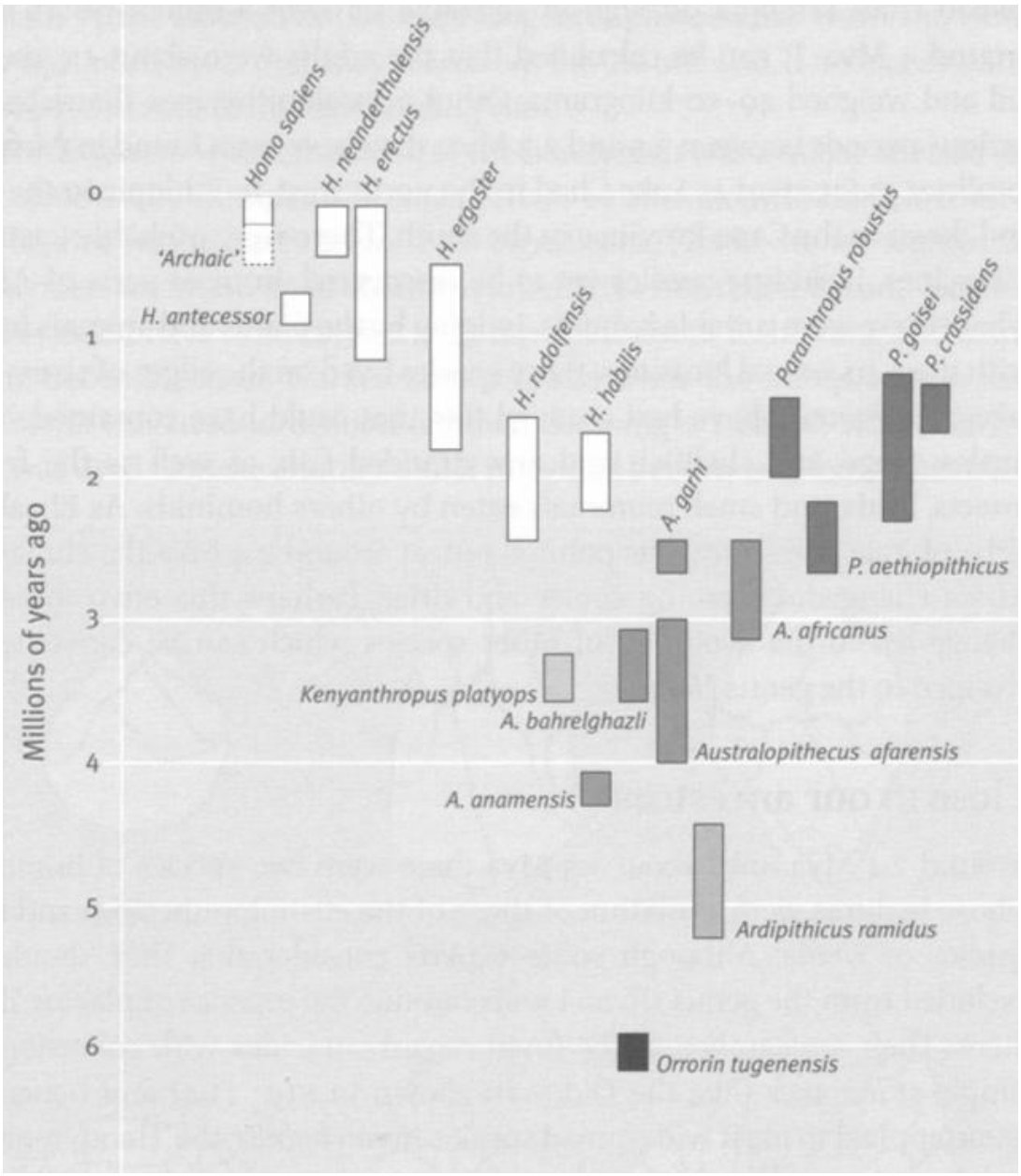

Figure 1. One reconstruction of the human ancestral tree. For most of the span of what he think of as being ourselves, human beings, there were actually at least three species of humans, *H. sapiens*; *H. neanderthalensis* and *H. erectus*. *H. ergaster*, which may or may not overlap with *H. sapiens*, is considered by some to be the first human.

Archaic *H. sapiens* appear in the fossil record about 400,000 years ago in Africa, Europe and Asia, and modern forms approximately 100,000 years ago[341]. We modern humans coexisted with at least two other species of *Homo: H. neanderthalensis* and *H. erectus*[342], until at least 30,000 and 27,000 years ago respectively.

To Southwood's figure, however, it appears that we need to add a new species, discovered in the last months of writing this thesis. A species of pygmy human has been discovered in Indonesia, and named *H. floresiensis*[343]. It existed about 18,000 years ago, and is thought to have evolved from *H. erectus*. Its small size is thought to reflect the common trend towards dwarfism found in many island species, like the pygmy elephants *H. floresiensis* hunted. It appears then, that 30-50,000 years ago there were four hominid species in existence: *Homo sapiens, neanderthalensis, floresiensis* and possibly *erectus.* The human tree is a bush, pruned by contingency and perhaps *H. sapiens.*

H. floresiensis probably went extinct when a massive volcano erupted on their island. Neanderthals, on the other hand, apparently went extinct because of *H. sapiens*, even if not deliberately. One suggestion is that through interbreeding they became 'subsumed' into the *H. sapiens* gene pool[344], though recent research argues, admittedly inconclusively, against this[345]. Other possibilities are that Neanderthals were actively driven to extinction[346] or indirectly out competed. All three interactions may have happened in different places. In the Levant, which includes Israel, *H. sapiens* and *H. neanderthalensis* coexisted for about 60,000 years, whereas in Europe the latter disappeared within 10,000 years of the arrival of *H. sapiens*[347].

So modern *H. sapiens* has existed for only about four percent of the existence of the genus, *Homo*; less than two percent of the existence of hominids; 0.2 percent of the time since the great mammal explosion; and 0.002 percent of time since the origins of life on Earth. To represent this another way, if we marked significant events on a ruler, and used *1cm* to represent all of *H. sapiens* existence; the genus *Homo* would occupy about 18cm (the width of this page); hominid evolution 60cm; the "age of mammals" 650 cm, and the beginning of life on Earth would be plotted 385 *meters* away[348]! The life of the Christian church would occupy just one twentieth of one millimetre (about a tenth of a full-stop on this page)[349].

Richard Dawkins attempts to convey the history of life on Earth as an arm span. If life begins at the left finger tip, then dinosaurs appear on the palm of the right hand, and go extinct at the last finger joint. Mammals then become the dominant terrestrial vertebrate, with the entire existence of *Homo* fitting in a nail clipping, and all recorded human history amounting to the dust of a single nail file

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[341] Ibid, pp. 224-9. The Cro-Magnon people are an example of archaic *H. sapiens.* Our modern form is only slightly different. We are technically known as *Homo sapiens sapiens*, but in this thesis I shall simply refer to existing humans as *H. sapiens*. The modern form is only geologically "modern"- it still dates back 100,000 years!

[342] Ibid, p. 224.

[343] Ann Gibbons, "New Species of Small Human Found in Indonesia," *Science* 306 (2004).

[344] Wong cites Trinkaus and Duarte (p. 31) and Wolpoff (p. 37) as supportive of this view in her review of the latest theories about Neanderthals (Kate Wong, "Who Were the Neanderthals?," *Scientific American* 13, no. 2 (2003).

[345] David Serre et al., "No Evidence of Neandertal mtDNA Contribution to Early Modern Humans," *PLoS Biology (Public Library of Science Biology)* 2, no. 3 (2004). This research does not disprove human-Neanderthal interbreeding, but simply found no evidence that this had occurred frequently enough for Neanderthal mitochondrial DNA sequences to become established in human populations. It established no *large* contribution of Neanderthal DNA to humans, but could not exclude the possibility of smaller contributions.

[346] Tattersall, "Once We Were Not Alone." Tattersall suggests the that advent of more advanced tools amongst *H. sapiens* led to the overwhelming of Neanderthals.

[347] Ibid: p. 26. Others believe that the thousands of years of overlap in Europe is still plenty of time for interbreeding to cause the disappearance of Neanderthals, for example Wong, "Who Were the Neanderthals?."

[348] Discrepancies between the two illustrations are due to rounding errors in the first example.

[349] To include the beginning of the universe would require a line about 1.6km long.

stroke[350]. Mayr represents the history of life as a calendar year, in which mammals arrive on December 12th, Hominids at 10am New Year's Eve, and *H. sapiens* at 11:56:30[351].

Now that we have a glimpse of the time scale of life on Earth, it is time to consider the *mechanisms* by which life evolved and by which it continues to flourish today.

8.2.2 What is evolution?

The theory of the evolution of life on Earth as we have it today rests on the foundation laid by Charles Darwin. Darwin was not the first to offer a theory of the mechanisms of evolution, but his synthesis had an unparalleled impact on scientific thought about the evolution of species,

> "No scientific revolution can match Darwin's discovery in degree of upset to our previous comforts and certainties… [it] revolutionised our view of our own meaning and essence (insofar as science can address such questions at all) Who are we? How did we get here? How are we related to other creatures, and in what manner?[352]"

Darwin's theory was built on three universally accepted observations;

1. All organisms produce more offspring than can possibly survive.
2. All organisms within a species vary, one from the other
3. At least some of this variation is inherited by offspring[353].

Darwin inferred from these facts his theory of natural selection. That is, of the many offspring produced in each generation, the few who survive long enough to breed will tend to be those who, by chance, are better adapted to the current local environment. In other words, the "natural" environment "selects" the best adapted, or "fittest" to be the breeders of the next generation. Survival of the fittest was a term Darwin adopted only reluctantly at the insistence of his friend Alfred Wallace. Because of the misunderstandings this phrase frequently leads to, I shall continue to use Darwin's original term, Natural Selection[354].

Darwin himself could only guess at the mechanism that lay behind the inheritance of variation. It was not until the 1920s that people realised the importance of the phenomenon of genetic mutation as an explanatory tool for Darwinian evolution. Eventually, evolutionists constructed the Modern, or Evolutionary, Synthesis from 1937-47. The Modern Synthesis used new knowledge about genetics to explain the mechanism for the variation in a population which was inherited by offspring (Darwin's points 2 and 3 above), and brought widespread consensus[355].

Gould, Mayr and Dawkins, three significant figures in the discussion of evolution in scientific and popular circles[356], agree that the Modern Synthesis is correct as far as it goes. That is, *genetic mutations lead to variable phenotypes amongst organisms, upon which natural selection acts*. They

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[350] Richard Dawkins, *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder* (London: Allen Lane (Penguin), 1998), pp. 12-13.
[351] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 69.
[352] Gould, "Introduction," p. xi.
[353] Ibid, p. xii.; Stephen Gould, *The Structure of Evolutionary Theory* (Cambridge and London: The Belknap Press of Harvard University Press, 2002; reprint, fifth), p. 13.
[354] Richard Dawkins, *The Extended Phenotype: The Gene as the Unit of Selection* (Oxford: W. *H.* Freeman and Company, 1982), pp. 179-80. Dawkins argues convincingly against using "survival of the fittest," because of the confusion it causes. The primary objection for Dawkins is that "survival of the fittest" suggests that individual organisms are the primary units of selection. Secondly, "fit" has many meanings in the literature and is therefore misleadingly ambiguous.
[355] Jared M Diamond, "Foreword to *What Evolution Is*," in *What Evolution Is* (London: Phoenix, 2002), p. x. A full account of its development can be found in Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 525-40.
[356] Chris Daniels, email, 17 December 2003.

are all confident that this process has been validated to such an extent that it is no longer merely a theory, but may be designated as true and factual[357].

There are also sharp disagreements amongst them, which I shall explore now. I shall also introduce the theories of Lynn Margulis and Dorion Sagan, who have yet another way of looking at the evolutionary story. Margulis and Sagan, themselves Darwinists, disagree sharply with the Modern Synthesis, claiming that its proponents are zoocentric[358], and at least some of it concepts are "entirely wrongheaded," obscuring more than they reveal. In order to compare and contrast the evolutionary stories from these four protagonists[359], I shall adopt the framework Gould proposed with which to categorise the currents of debate. As we shall see, Gould took great pains to ensure that his framework would be something that could be accepted by his opponents, even if they disagreed with the details of his own reconstruction.

Gould accepts that the Modern Synthesis was successful in fending off anti-Darwinist explanations for the origins of the life we see around us. He contends, however, that the Modern Synthesis was initially generous of spirit and somewhat pluralistic in form, before later becoming calcified into a restricted version[360]. This restricted version required an exclusive commitment to adaptationism, and natural selection as a virtually exclusive mechanism for evolution[361]. For example, he claims that in 1963 Mayr characterised the Modern Synthesis thus,

> "…*all* evolution is due to the accumulation of small genetic changes, guided by natural selection… transspecific evolution is nothing but an extrapolation and magnification of the events that take place within populations and species (emphasis mine).[362]"

Gould believes that from the seventies onwards there was a resurgent antithesis to the Modern Synthesis, which is still being worked through. This new understanding, he says, retains its basis in Darwinism, but builds upon and expands the original theory by removing its 19th century philosophical and metatheoretical commitments[363]. According to Gould, the antithesis proves that, "If Mayr's characterization of the [Modern Synthesis] is accurate, then that theory, as a general proposition, is effectively dead, despite its persistence as textbook orthodoxy.[364]" What remained for Gould was to show the limitations of the Modern Synthesis, and to argue for the inclusion of the post seventies antithesis.

This confronts Gould with a dilemma - how can he convince those Darwinians who accept the Modern Synthesis, that *his* synthesis is recognisably Darwinian[365]? His first step is to define Darwinism in terms,

> "…specific enough to win shared agreement and understanding among readers, but broad enough to avoid the doctrinal quarrels about membership and allegiance that

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[357] Gould, "Introduction," p. x. Also Ernst Mayr, *What Evolution Is*, paperback edition. First edition published in 2001 in the USA by BasicBooks ed. (London: Phoenix, 2002), pp. 14-16, 303. Also Richard Dawkins, *The Selfish Gene*, second ed. (Oxford: Oxford University Press, 1989), p. 1.

[358] That is, focussed on animals, from insects to mammals, rather than acknowledging the importance of the microbial world.

[359] I count Margulis and Sagan as one protagonist. The sections of the book which are of interest in my thesis, are almost entirely derived from the work of Margulis over many years.

[360] Gould, *The Structure of Evolutionary Theory*, p. 23.

[361] Ibid, pp. 46, 70.

[362] Ibid, p. 1003. He does not include the full reference, which is to page 586 of Mayr's 1963 classic (Ernst Mayr, *Animal Species and Evolution* (Cambridge: Harvard University Press, 1963).)

[363] Gould, *The Structure of Evolutionary Theory*, p. 23.

[364] Ibid, p. 1003. He first made this statement in 1980, in the article, Stephen Gould, "Is a New and General Theory of Evolution Emerging?," *Paleobiology* 6 (1980).

[365] In this, his concern somewhat parallels one of the tasks of this thesis: to demonstrate that a Christian community which integrates a new worldview remains Christian, even if it opens up possibilities which many Christians will not accept.

> always seem to arise when we define intellectual commitments as pledges of fealty to lists of dogmata.[366]"

To do this he needs to reach consensus with his opponents about the amount of dissent one can express whilst still being accepted as a Darwinist. Not only historical continuity with the ideas of Darwinism, but also shared commitment to their meaning today is required for scientists to be able to say that they are part of the one intellectual movement.[367] He therefore seeks a,

> "…*minimal list* of the *few defining attributes* of the theory's *central logic*… [without] which the theory would either collapse into fallacy or operate so differently that the mechanism would have to be granted another name. (emphasis his)[368]"

Gould concludes that there are three principles which encapsulate the Darwinian paradigm. Rejection of any of these three makes one a non-Darwinist. To convey this, since primates process complex thoughts best as pictures[369], he uses the image of a three legged stool. As his entire book seeks to demonstrate, these three principles are those around which there has been the greatest controversy, and in which there are still conceptual weaknesses. Expressing the three principles in the language of Darwin, and as insisted upon in the calcified Modern Synthesis, Gould says that they concern;

AGENCY- *Individuals are the agents of evolution*. Darwin argued that the apparent order of creation, traditionally claimed to be evidence for a benevolent and powerful designer, was actually a side effect of the struggle of *organisms* to survive. It was not God, but *individuals*, and their struggle to survive which was the driving force for creation as we see it[370].

EFFICACY- *Natural Selection can explain all that we now see.* Many people accepted Darwin's claim that natural selection was a reality. His opponents rejected Darwin's claim that this alone could account for all the variation in nature. Darwin insisted that natural selection was sufficient.

SCOPE- *Selection upon individuals explains all of evolution.* Even Darwin's supporters struggled to see how his theory could explain macroevolution (evolution at levels above species). Darwin believed that the immensity of geological time meant that evolution on the small scale could eventually account for all evolution, stating that apparent gaps between species and higher taxa in the fossil record were due to the relative rarity of fossilisation[371].

Gould argues that such a limited view of Darwinism can no longer be accepted, hence his book, which,

> "… attempts to expand and alter the premises of Darwinism, in order to build an enlarged and distinctive evolutionary theory that, while remaining within the tradition, and under the logic, of Darwinian argument, can also explain a wide range of macroevolutionary phenomena lying outside the explanatory power of extrapolated modes and mechanisms of microevolution, and that would therefore be assigned to contingent explanation if these microevolutionary principles necessarily build the complete corpus of general theory in principle.[372]"

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[366] Gould, *The Structure of Evolutionary Theory*, p. 7.
[367] Ibid, p. 10.
[368] Ibid.
[369] Ibid, p. 15.
[370] Darwin allowed that the term, "struggle" was usually metaphorical. Whilst rams may struggle for mates in combat, plants, for example, simply either survived or did not without any conscious struggle.
[371] Gould, *The Structure of Evolutionary Theory*, pp. 14-15.
[372] Ibid, p. 1339. Perhaps he can be forgiven for having such a long summarising sentence, given that the book is 1,300 pages!

Gould then attempts to expand his version of the Modern Synthesis within each of these three categories. I shall now consider to what extent his attempts have been accepted by Mayr, Dawkins, and Margulis & Sagan.

AGENCY- Gould argues that the Modern Synthesis's fundamentalism with respect to the organism as the agent of selection cannot stand in the light of new evidence. Gould claims that we must recognise a hierarchy of selection operating on genes, cell lineages, organisms, demes, species and clades[373]. Mayr partially agrees, mentioning that genes, individuals, species and populations are significant entities in evolution. Whilst he says that it is the changes in populations which characterise evolution, he argues that individuals are the agents on which selection acts[374], and rejects most forms of group selection[375]. Dawkins' thought on the matter is a little more difficult to characterise. It is clear that he preferences the gene[376] as the fundamental unit of selection, as he argues most extensively in the revealingly titled, *The Extended Phenotype: The Gene as the Unit of Selection*[377]. Gould appreciates that Dawkins' work has undermined the neo-Darwinist obsession with the individual as the only unit of selection, but castigates Dawkins for replacing one level of reductionism with another[378]. Gould claims that Dawkins supports his extended hierarchy of selection though he grasps it, "through a glass, darkly," and implies that Dawkins' ongoing defence of gene-level selectionism is more about recalcitrance than evidence[379]. His main evidence for this comes from a chapter in Dawkins' work, *Climbing Mount Improbable*, in which he mentions the possibility of natural selection choosing amongst large groupings[380]. Gould's review of *Climbing* is scathing, except for two chapters in which he finds reason to, somewhat patronisingly, welcome Dawkins into his club,

> "The last paragraph of this chapter [Kaleidoscopic Embryos] reiterates these themes in a manner almost suggestive of a personal epiphany. As a former anathamee, I can only cheer from the sidelines and say "bravo and welcome.[381]"

Gould then laments that subsequent paragraph's return to Dawkins' "worn-out and illogical 'selfish gene' theory.[382]" Gould's claim that Dawkins unwittingly agrees with him is overstated. Certainly, Dawkins is unconvinced. The year after Gould's review, Dawkins released *Unweaving the Rainbow*, in which he observed that,

> "… Gould is one of the few Darwinians who still think of natural selection as working at levels higher than the individual organism.[383]"

This is probably true, but many are not convinced by Dawkins either, and continue to argue that the individual is the main unit of selection[384]. Mark Ridley demonstrates convincingly, however, that

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[373] Ibid, p. 21, 62.
[374] Mayr, *What Evolution Is*, pp. 140-42. He has held this position since the 1950s (Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 101.)
[375] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 119-23.
[376] It is actually a lot more complicated than that, since in some cases sections of DNA larger than single genes may be thought of as being inherited as units, and sometimes pieces smaller. The details are irrelevant to this thesis, but receive extended consideration in Dawkins, *The Extended Phenotype*, pp. 85ff. Dawkins acknowledges another unit of evolution, the meme, which is a unit of cultural transmission such as a song, fashion, or architectural development. These replicators, however, are not mechanisms of biological evolution- they are derivatives of it, and so will not be considered further. His seminal thinking in this area is found in Dawkins, *The Extended Phenotype*, chapter 11.
[377] Dawkins, *The Extended Phenotype*.
[378] Gould, *The Structure of Evolutionary Theory*, p. 72.
[379] Ibid.
[380] Stephen Gould, *Self-Help for a Hedgehog Stuck on a Molehill: Struggle to Inform the Public About Darwinian Evolution* [internet] (Reproduced from *Evolution*, **51**(3), June 1997, 1997 [accessed 16 December 2003]), available from http://www.world-of-dawkins.com/Media/cmi_gould.htm.
[381] Ibid.
[382] Ibid.
[383] Dawkins, *Unweaving the Rainbow*, p. 199.
[384] Mark Ridley, *Evolution* (2nd) (Reproduced from *Evolution*, Chapter 12, "The Units of Selection," Blackwell Science Inc, 1996 [accessed 16 December 2003]), available from http://www.world-of-dawkins.com/Catalano/gfiles.htm.

whilst the action of individuals is clearly important for their survival, it is their very perishability which precludes them as the units of selection[385]. He shows that whilst the behaviour of individual organisms, for example, may be involved in selection, it is *essential* that this behaviour have a genetic basis if it is to be inherited, and therefore evolvable. Genes therefore, not organisms, or any higher level for that matter, have priority as units of selection[386].

Mayr disagrees with Ridley, and therefore Dawkins. He believes that the very concept of the unit of selection is confusing. He argues that no gene can be selected in isolation, since some will be deleterious in some whole genotypes, and advantageous in others. He believes that whilst evolution leads to the change in frequency of genes in a population, only gene-composites (i.e. individuals) can be targeted by selection[387]. Here Mayr distinguishes the *unit* of selection (which he is happy to admit may be the gene), from the *target* of selection, i.e. that which natural selection actually works on and selects amongst, which is the individual[388]. He believes that the confusion of the units and targets of selection is the basis of the genic selectionists. Dawkins believes that such distinctions miss the point, since he agrees that genes are not selected in isolation, but rather *for their capacity to cooperate*[389]. The difference seems to be that Mayr assumes that individual animals are the true gene-composites, whereas Dawkins convincingly argues that this is not the case, for gene interactions transcend the individual host organism. This is his extended phenotype concept[390]. Dawkins' claim that his ideas are compatible with Mayr's seems persuasive, as does his claim that his views are a better way of expressing what they both agree with. Since the argument from Mayr, above, was written only last year, he clearly disagrees, though perhaps there is some convergence, as he uses the extended phenotype concept in his latest work, though without explicitly affirming all that Dawkins claims for it[391].

Margulis and Sagan disagree with Gould, Mayr *and* Dawkins. They accept only one unit of selection (against Gould), but locate it between Mayr's organism and Dawkins' gene. For them, it is the *cell* which drives evolution,

> "DNA… stores evolutionary information but does not create it. Selfish genes… may be taken as figments of an overactive, primarily English speaking imagination. *The living cell is the true self... The engine of evolution is driven by tiny selves of which we are only half conscious*…The bacteria… The actions of the bacteria and other subvisible selves perpetuate old and generate new species (emphasis mine).[392]"

Margulis and Sagan attack the very notion of an organism as understood by most biologists, who are preoccupied with large animals and plants. They argue that what most zoologists would consider to be individuals (eg a cow, or a human) are actually assemblages of symbiotic relationships. The mammalian part of a cow, for example, is intimately connected with the microbial gut fauna which digest cellulose in its gut[393]. The many microbes and minute invertebrates that live symbiotically with the mammalian part of *H. sapiens*, from eye mites to gut bacteria, comprise about *ten percent* of our dry body weight[394]. Even more symbiotically integrated are the 250 bacterial genes which have become incorporated directly into our DNA[395]. It is ironic that Margulis and Sagan are so critical of Dawkins, to whom they allude in the above quote. He accepts this aspect of their work, and wants to

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[385] Ibid.
[386] Ibid.
[387] Mayr, *What Evolution Is*, pp. 140-42. He provides the argument in more detail in Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 101-03.
[388] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 123-24.
[389] Dawkins, *The Extended Phenotype*, p. 239.
[390] Ibid.
[391] Mayr, *What Evolution Is*, p. 142.
[392] Lynn Margulis and Dorion Sagan, *Acquiring Genomes: A Theory of the Origins of Species* (New York: Basic Books, 2002), p. xvi.
[393] Ibid, p. 14.
[394] Ibid, p. 18.
[395] Ibid, p. 76.

take it *further*[396]. It does seem that main focus fits well with his hypothesis of the extended phenotype, especially their symbiogenesis hypothesis. This hypothesis directly challenges Gould's second category, that of efficacy, and I will return to it shortly[397].

EFFICACY-
Gould reinvigorates orthogenesis as a challenge to Darwin's claims of the total efficacy of natural selection. As he says, "Most textbook one-liners have dismissed orthogenesis as a theistic remnant operating as a mild pollutant within science.[398]" Mayr, for example, dismisses orthogenesis as something based on cosmic teleology, or finalism, which has been, "thoroughly refuted.[399]" Gould, however, demonstrates that most proponents of orthogenesis were determinedly non-theistic. Orthogenesis was primarily the theory that the full range of possible variation in a generation is not available to natural selection to operate on. Rather, variation is constrained to certain channels or directions. Advocates of orthogenesis were wrong, Gould argues, because claiming that the channels were unidirectional, and tried to *replace* natural selection with orthogenesis, rather than accepting that both processes play a role in evolution[400].

So Gould's limited, *non-theistic* orthogenesis is simply the presence of, "structural, historical and developmental constraint in channelling pathways of evolution, often in highly positive ways.[401]" Mayr accepts that this happens, and lists a number of such constraints, though he does not use the term orthogenesis[402]. Chance is also a major factor according to Mayr[403], which does not so much channel natural selection as cut across it,

> "Because evolution can only tinker, it cannot produce the best possible of all designs… it is often stuck making the best of a bad situation.[404]"

Organisms which survive and reproduce do not have to be the *best* of all possible combinations of genes, but simply a *better* combination than others[405]. Both Dawkins[406] and Mayr[407] provide lists of the various constraints which prevent natural selection from developing perfect organisms. Mayr distinguishes natural selection from sexual selection, which is the ability to attract mates. He shows that natural and sexual selection at times select in different directions, such as the evolution of the striking colour of many male birds, which attracts females, but also predators, thus increasing reproduction at the likely expense of survival[408]. He also explains that the more pliable an organism's phenotype is, the less effectively natural selection can work on its genotype. Plants are the most striking example of pliable phenotypes; genetic clones will grow very differently depending on the soil and climate in which they are placed[409].

Dawkins addresses the constraints on natural selection in the same speculative chapter which Gould seized upon above, as evidence that Dawkins was beginning to agree with him. In admitting the

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[396] Richard Dawkins, *Universal Parasitism and the Co-Evolution of Extended Phenotypes* [internet] (reproduced from *Whole Earth Review*, Spring 1989, pp. 90-100, 1989 [accessed 16 December 2003]), available from http://www.world-of-dawkins.com/Dawkins/Work/Articles/1989univpara.htm.
[397] Page 74.
[398] Mayr, *What Evolution Is*, p. 352.
[399] Ibid, pp. 89, 133.
[400] Gould, *The Structure of Evolutionary Theory*, pp. 356-95.
[401] Ibid, p. 22.
[402] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 106-09. Mayr praises Gould & Lewontin for reminding people of the power of constraints on selection. This early list is expanded and modified only slightly in Mayr, *What Evolution Is*, pp. 155-62.
[403] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 110-12. Also Mayr, *What Evolution Is*, p. 156.
[404] Zimmer, *Evolution*, p. 128.
[405] Dawkins, *The Extended Phenotype*, p. 45.
[406] Ibid, pp. 30-54.
[407] Mayr, *What Evolution Is*, p. 155-61.
[408] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 128.
[409] Mayr, *What Evolution Is*, p. 157.

possibility of the sort of limited orthogenesis which Gould proposes, Dawkins is clear that what he means by apparent selection of larger groupings is only *somewhat analogous* to Darwinian selection[410]. It does not appear in any way to contradict, or require the sort of reworking of Dawkins' theories that Gould calls for[411]. Dawkins notes that Gould emphasises with approval the pluralistic character of Darwin's own thought about the mechanisms of evolution. He contends, however, that Darwin's pluralism was due to criticisms from his peers which have subsequently been shown to be false[412]. Dawkins freely admits that evolution occurs by mechanisms such as neutral mutation and genetic drift, but differentiates *evolution*, which may mean neutral change, from *adaptation*, which requires natural selection on phenotypes[413]. Adaptation is, to him, the overwhelmingly most significant and interesting form of evolution.

Dawkins points out that what is best in one generation will not be best in the next if the environment has changed. If we remember that the environment includes all other life forms as well as the abiotic surrounds, then the environment inevitably *will* be different in each generation. There is thus a time lag in natural selection. The faster the environment changes, the less well adapted the next generation will be.

There are also historical constraints which limit adaptation. The more specialised body plans become, the less they can be subsequently modified. Natural selection must choose from what is available at the time, to meet the current environmental challenges. For example, our front feet eventually evolved into hands, but no vertebrate has six feet.

There are limited resources for any one body. An animal cannot both sprint to evade predators and be heavily armoured against them. Time spent feeding limits time available for breeding. Camouflage requires the animal to stay fairly still, which may limit both its feeding and breeding.

All organisms could not be perfect anyway. If a perfect predator chases a perfect prey, what would happen? If two organisms perfectly compete for a shared resource, then what? Since the death of some organisms is essential for the life of others, a world in which all organisms perfectly escape death is impossible. Dawkins devotes a chapter of one of his works to explain how mimicry and camouflage is an effective strategy for organisms even if only partially effective, because the organism being tricked has only imperfect vision, and other things to occupy its limited brain[414].

As organisms become more complicated, and their behaviour is driven by conscious decisions as well as instinct, it becomes inevitable that they will make mistakes, especially as their environment is in many ways malevolent. Since organisms live in a dynamic web of other organisms which attempt (consciously or not) to manipulate or destroy them, it is impossible to be perfectly adapted. This is clearer if we look at the level of genes, and their chances of surviving into the next generation. An organism's genotype remains constant for its life, but its environment changes daily, even minute to minute. Successful genes, then, are often those that code for flexible, and therefore imperfect, strategies in their hosts.

Margulis and Sagan believe that the processes discussed above are only minor components of evolution. They propose that symbiogenesis is the major driving force at every stage of the evolutionary story from the origin of life to the present. Symbiogenesis is the process whereby a symbiotic relationship eventually gives rise to the fusion of two organisms into one, or more strictly, two genomes into one. For example, it was Margulis who demonstrated that the mitochondria in all

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[410] Richard Dawkins, *Climbing Mount Improbable* (not stated: Softback Preview, 1996), pp. 205, 35.
[411] Gould, *Self-Help for a Hedgehog Stuck on a Molehill*.
[412] Dawkins, *The Extended Phenotype*, p. 19.
[413] Ibid.
[414] Richard Dawkins, *River out of Eden: A Darwinian View of Life*, *Science Masters Series* (London: Weidenfeld & Nicholson, 1995), pp. 59-93.

plant and animal cells were initially free living organisms[415]. She proposed that chloroplasts were incorporated into plant cells in the same way[416]. Margulis and Sagan's thesis can be summarised in these quotes,

> "… let us now explain how new species come into being… Random DNA mutations, primarily destructive in their effects, account only for the beginnings. The role of randomness has been exaggerated in the evolutionary saga… *Live beings* by contrast are the protagonists (emphasis mine).[417]"

> "The agents of evolutionary change tend to be fully alive organisms, microbes, and their ecological relations, not just the random mutations these microbes have inside them… *The unseen beings* that decimate our populations with virulent disease and provide soil nitrogen to our food plants *play the major creative role in the genesis of new species*.[418]"

> "…this Darwinian claim to explain all of evolution is a popular half-truth whose lack of explicative power is compensated for only by the religious ferocity of its rhetoric. Although random mutations influenced the course of evolution, their influence was mainly by loss, alteration and refinement… Mutations, in summary, tend to induce sickness, death or deficiencies.[419]"

According to Margulis and Sagan, every step in the evolution of life up to the eukaryotic cell is the result of symbiotic fusion. Each of the major evolutionary transitions in cell type, from archaebacterium, through the protozoans and on to plant and animal cells, arose through the integration of new genomes into existing cells. They claim that the importance of symbiogenesis for animals is not limited to the formation of the eukaryotic cell, since even larger animals like cows and humans are themselves not strictly individual organisms, but composites of many different individuals.

How have their ideas been received? The symbiogenetic origins of chloroplasts and mitochondria are universally accepted by advocates of the Modern Synthesis[420], and most accept the formation of eukaryotic cells from a symbiogenesis of an archaebacterium with some eubacteria[421]. Mayr is not alone in claiming that the symbiogenic formation of the eukaryote is, "arguably the most important event in the whole history of life on Earth[422]." He accepts that symbiosis is not given nearly enough weight in discussions about evolution, yet he devotes only two thirds of a page to the concept in his latest book, *What Evolution Is*[423].

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[415] Lynn Margulis, *Origin of Eukaryotic Cells: Evidence and Research Implications for a Theory of the Origin and Evolution of Microbial, Plants and Animals Cells on the Precambrian Earth* (New Haven: Yale University Press, 1970), pp. 178-207. The success of her attempt is reported in Mayr (Ernst Mayr, "Foreword," in *Acquiring Genomes: A Theory of the Origins of Species* (New York: Basic Books, 2002), p. xii.)

[416] Margulis, *Origin of Eukaryotic Cells*, pp. 276-93.

[417] Margulis and Sagan, *Acquiring Genomes*, pp. xv, xvi. In her earlier work Margulis was more affirming of the importance of genetic mutation and natural selection (Margulis, *Origin of Eukaryotic Cells*, pp. 51, 48-52 respectively.) Whether this shift from 1970 to 2003 is the result of a change in her opinions, or a perceived need to make more extreme statements to engage those who continue to minimise the role of symbiogenesis is unclear.

[418] Margulis and Sagan, *Acquiring Genomes*, p. 39.

[419] Ibid, p. 29.

[420] Mayr, "Foreword," p. xii.. Dawkins is a little more cautious about the chloroplast hypothesis, which he calls "pretty uncontroversial" and "widely agreed." (Dawkins, *Unweaving the Rainbow*, pp. 225-28.) This may simply reflect that he is writing five years earlier than Mayr.

[421] Mayr, "Foreword," p. xii. Mayr reaffirms this hypothesis for the origins of eukaryotes in his own book, Mayr, *What Evolution Is*, p. 48.

[422] Mayr, *What Evolution Is*, pp. 48-49.

[423] Ibid, pp. 233-34.

More attention is devoted to the topic in Carl Zimmer, although he focuses on the slightly different reconstruction by Carl Woese[424]. Zimmer acknowledges that symbiogenesis was not taken seriously until the early sixties, and so excluded from the Modern Synthesis[425]. Nevertheless, he claims that symbiogenesis, "still follows Darwin's basic rules.[426]" This is true only because Darwin was ignorant of genetics in the first place. There is nothing in the Modern Synthesis (as Zimmer admits), which predicts a process like symbiogenesis. It *is* true that once symbiogenesis has occurred, the resulting organism will be acted upon by Darwinian processes. So symbiogenesis is not, (*contra* Margulis & Sagan) an alternative to natural selection, but only to random mutation, and so it expands rather than overthrows the Modern Synthesis.

Margulis' obsession with cells leads her to speculate that Earth itself is one enormous cell. She was an early collaborator with James Lovelock in the work on the Gaia hypothesis[427]. Their early presentation of the thesis was emphatically rejected by evolutionists. Dawkins criticised the apparent assumption that the ecology of Earth was benign, guided by an overarching cooperative principle, even consciousness. Dawkins picks on the language Lovelock used to explain the proportions of various gases in the atmosphere[428], which result from the fact that, "… the biosphere actively maintains and controls the composition of the air around us, so as to provide an optimum environment for terrestrial life.[429]" Dawkins demonstrated that the idea of a homeostatically adapted Earth fails either because of its reliance on group selection[430], or the necessity for a universe of competing, *breeding* planets amongst which natural selection would "choose" the best survivor[431].

To use some examples not mentioned by Dawkins, Lovelock says that the diatom lifecycle is a, "… conveyor belt *constructed by Gaia*.[432]" Similarly, the creatures who inhabit brine pools do so only because they have been *given permission* by the rest of the living world[433]. To my mind, however, Lovelock's claims look more like a byproduct of loose language rather than factual assertions. Loose language is widespread in scientific writing, for example the oft repeated claim that some property of an organism has evolved *for* some purpose or other. Dawkins himself devotes a book to the exploration of good scientific poetry, in which he acknowledges that the "selfish gene" is just a metaphor, which can lead people awry if they misunderstand personification[434]. All Dawkins has done is disprove a sentient, cooperative, version of Gaia, one which is only implicit in the text. For example, Lovelock clearly did not mean that plants produce oxygen *for* other life (Dawkins' first example), in the light of his other explanations of the polluting effects of oxygen to which other components of the ecosystem needed to adapt if they were to survive[435].

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[424] Zimmer, *Evolution*, pp. 107-15. The differences seem to relate mostly to the number of kingdoms of life, five for Margulis & Sagan, and three for Woese. The differences are explored in Margulis and Sagan, *Acquiring Genomes*, p. 154. The details, however, are not important here.

[425] Zimmer, *Evolution*, pp. 112-14. He talks about "symbiotic theory," but is clearly referring to the same process which Margulis & Sagan call symbiogenesis. Margulis and Sagan document that symbiogenesis was taken more seriously in Russian, French and German speaking institutions as far back as the 1860s (Margulis and Sagan, *Acquiring Genomes*, p. 97.).

[426] Zimmer, *Evolution*, p. 114.

[427] J. E. Lovelock, *The Ages of Gaia : A Biography of Our Living Earth*, *The Commonwealth Fund Book Program.* (Oxford: Oxford University Press, 1988), p. xvi, Lynn Margulis, "Another Four-Letter Word: Gaia," *Whole Earth* (1998).

[428] J. E. Lovelock, *Gaia: A New Look at Life on Earth*, first ed. (Oxford: Oxford University Press, 1979), pp. 69-83. Cited in Dawkins, *The Extended Phenotype*, pp. 235-36.

[429] Lovelock, *Gaia (1979)*, p. 69.

[430] Now almost completely rejected, see Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 79.)

[431] Dawkins, *Unweaving the Rainbow*, p. 222. See especially Dawkins, *The Extended Phenotype*, pp. 234-38.

[432] Lovelock, *Gaia (1979)*, p. 96.

[433] Ibid, p. 89.

[434] Dawkins, *Unweaving the Rainbow*, p. 233.

[435] Lovelock, *Gaia (1979)*, p. 109.

Lovelock accepted Dawkins' criticism as evidence that the hypothesis had been poorly stated and thought through, but only in some aspects which were not central to his main point[436]. In his preface to the revised edition of *Gaia*, Lovelock maintains that, although he did poorly present some ideas in the original work, he also made clear that his attributing sentience or purpose to Gaia should not be taken literally[437]. Recent presentations have emphasised that the Gaia hypothesis is not a teleological mechanism, as evidenced by the use of the completely mechanistic "Daisyworld" model to explain climate regulation by living organisms[438]. The central claim of the Gain hypothesis has always been that evolutionists traditionally underemphasise the coevolution of living organisms and their non living environment[439]. Most importantly, life (the biota) regulates the temperature and composition of Earth's surface, so that the *abiotic* environment evolves with and in response to the biotic environment. This implies that the evolution of life is not constrained only by "the environment", but by the rate at which it is able to induce changes in the environment.

For example (mine, not theirs), the evolution and spread of aerobic organisms was constrained by the need to wait until the photosynthesis organisms had sufficiently modified the Earth's atmosphere. This is not to say that organisms, or genes, "waited", but that when viewed from a whole Earth perspective, the spread of aerobes around the globe had to wait. Gould does not appear to be aware of the clarified hypothesis, since he still rejected it on Dawkins' grounds only a few years ago[440]. Mayr reports that few evolutionists accept it[441], because as he presents it, the theory involves an inherent program. Even then he admits the theory is not incompatible with Darwinian evolution[442], but he does seem to be referring to the earlier, more teleological presentation of the hypothesis which Lovelock himself rejects. Mayr certainly accepts abiotic-biotic interaction and coevolution.

It appears, then, that all of the authors I am considering reject any idea that the whole Earth system is built through any kind of global consciousness or teleological cooperative effort. They accept, however, that there is an intimate link between biotic and abiotic systems, and that the lag between new biological innovations and their full expression in the abiotic environment may constrain the pace of evolutionary change. Where Gould deals with the question of time scales specifically is in the third aspect of his framework; the notion of scope. This encapsulates his claim that different evolutionary mechanisms operate at different time scales.

SCOPE- A key example of this phenomenon, for Gould, is punctuated equilibrium, a concept which he helped develop and is famous for championing. Mayr agrees that punctuated equilibrium is compatible with Darwinism. He goes further, however, arguing that it is compatible with *gradual* Darwinian evolution and that there is "no conflict whatsoever" between punctuated equilibrium and the original Modern Synthesis[443]. He believes that Darwin was correct in claiming that the fossil record is incomplete, and misleadingly gives the appearance of saltations[444].

Gould believes just the opposite. He works from the assumption that the fossil record is a reliable indication of the way a species have changed over time, and that punctuated equilibrium and mass extinction events, *rather than* gradual evolution are the best explanations of the fossil record as we have it. For Gould, gradual, or micro, evolution occurs only at the lowest tier, and cannot simply be

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[436] Lovelock, *The Ages of Gaia : A Biography of Our Living Earth*, pp. 32-34.
[437] J. E. Lovelock, *Gaia: A New Look at Life on Earth* (Oxford: Oxford University Press, 1995), p. ix.
[438] Lovelock, *The Ages of Gaia : A Biography of Our Living Earth*, pp. 42-64, Lynn Margulis and James E Lovelock, "Gaia and Geognsy," in *Global Ecology: Towards a Science of the Biosphere*, ed. Mitchell Rambler, Lynn Margulis, and Rene' Fester (Boston: Academic Press Inc, 1989), pp. 14-16.
[439] Lovelock, *The Ages of Gaia : A Biography of Our Living Earth*, p. 30.
[440] Gould, *Self-Help for a Hedgehog Stuck on a Molehill*.
[441] Mayr, *What Evolution Is*, p. 45. In a questions and answers section at the back of the book, he states that the Gaia hypothesis
[442] Ibid, p. 307.
[443] Ibid, p. 298.
[444] Ibid, p. 210.

scaled up to account for changes at other tiers[445]. Certainly, at the very least, Mayr seems to underplay the role of mass extinction events, which led to profound shifts in the composition of species and populations.

Dawkins criticises Gould for lumping very different types of non-gradual evolution together. He agrees with Mayr that punctuated equilibrium is simply gradual Darwinian natural selection operating at a faster than usual pace, over perhaps tens of thousands rather than millions of years[446]. Dawkins admits that individual macromutations may occur (large changes in phenotype caused by a single mutation, rather than many progressive small ones), but only very rarely, rendering them practically insignificant as mechanisms of evolution[447]. He refutes the claim that punctuated equilibrium is a unique aspect of evolution at some length, before concluding that, "When you spell out the Gouldian rhetoric into real-life practicalities, it stands revealed as the purest of bad poetic science.[448]"

Dawkins and Gould *do* agree on the aspect which Mayr appears to underplay, the role of catastrophes in dictating the forms of life we see today[449]. Rather than try to include catastrophism as part of a continuum of time-scaled phenomena, Dawkins simply says that catastrophes are non-Darwinian phenomena, after which natural selection restarts on the survivors[450].

Overall, Gould's framework has been a useful one within which to debate evolutionary processes. It succeeded in including the work of evolutionists like Margulis, whose work Gould did not consider and with whom he would have significant differences. It also included Mayr, with whom Gould has some disagreement, and Dawkins, with whom he has much more. As we will see later, it can even include versions of theistic evolution, though Gould personally rejects all of them[451]. But does the inclusion of symbiogenesis and catastrophism, and to a lesser extent orthogenesis, really create a new world view which, as Gould claims, "…must be construed as basically different from the canonical theory of *natural selection*, rather than simply extended (emphasis mine).[452]"? Mayr and Dawkins respond with an emphatic, "No."

Mayr argues that his characterisation of the Modern Synthesis, which Gould said was effectively dead[453], was misunderstood by Gould. What Mayr was actually describing was a very reductionist interpretation of the Modern Synthesis[454]. Mayr thus agrees with Gould's final framework, but disagrees that the Modern Synthesis *as a whole* was ever as canonically narrow as Gould maintains[455]. He accepts that there was a brief overemphasis on natural selection, to finally bring an end to Lamarckism, but that this rapidly gave way to an exploration of the stochastic processes and constraints that Gould went on to emphasise[456]. Nevertheless, he admits that the initial synthesis was an "extreme simplification," because individuals frequently forgot the pluralism of evolutionary mechanisms[457]. Quickly, however, in his view, a more realistic theory was fleshed out[458], which revised the original Darwinian theory in at least thirteen ways. These changes, he claims, were reformulations rather than substantive changes. Mayr believes that the supposedly novel theories

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[445] Gould, *The Structure of Evolutionary Theory*, p. 21.
[446] Dawkins, *Unweaving the Rainbow*, p. 197.
[447] Ibid, p. 199. Also Dawkins, *Climbing Mount Improbable*, p. 232-33.
[448] Dawkins, *Unweaving the Rainbow*, pp. 197-208.
[449] Ibid, p. 199. Also Richard Dawkins, *Response to Andrew Brown's "Feud for Thought" (the Guardian)* [internet] (Reproduced from *The Guardian*, 16 June p. 14, 1997 [accessed 16 December 2003]), available from http://www.world-of-dawkins.com/Dawkins/Work/Articles/feud.htm.
[450] Dawkins, *Unweaving the Rainbow*, p. 199.
[451] Gould, *The Structure of Evolutionary Theory*, p. 21.
[452] Ibid, p. 3.
[453] Page 69.
[454] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 464, 535.
[455] Ibid, pp. 534-35.
[456] Ibid, pp. 528-29.
[457] Ibid, pp. 540-42.
[458] Ibid, pp. 530-31.

Gould introduces, where they are correct, may be, "basically different from the canonical theory of *natural selection*," but that the canonical theory was never limited to natural selection in the first place[459]. Gould is therefore, in Mayr's view, attacking a phantom. He concludes,

> "Neither the discovery of numerous new facts relating to evolution nor the development of new concepts of speciation and genetic variation have required any essential revision of the picture of evolution as developed during the evolutionary synthesis. I emphatically deny the claims of various authors that these recent developments have led to an end of Darwinism, or of neo-Darwinism, or of the evolutionary synthesis. They are simply a filling in of missing pieces…[460]"

Dawkins believes that his promotion of gene-level selection and the extended phenotype fits firmly within the logic of Darwinism and the Modern Synthesis. He is sceptical, and characteristically blunt, about Gould's claims to offer a revolutionary new view,

> "[Gould's] quixotic strawmandering, his shameless windmill-tilting, seem almost designed to encourage misunderstanding... Readers regularly gain the impression that he is saying something far more radical and surprising than he actually is. [461]"

Francis Steen, in his review of the ongoing clashes between Gould and his many critics including Dawkins, concludes that there is not much of substance in the debate, in which there is a tendency, especially on the part of Gould, to, "magnify every straw into a forest of spears.[462]" Dawkins himself admits that there are many important points on which he and Gould agree[463].

So although Gould has not convinced his peers that he has created something fundamentally different, the framework in which he set the debate *has* provided a way of comparing and contrasting different views about what evolution is and how it operates:

AGENCY- All agreed that individual organisms are not the (only) units of selection, but none respond favourably to the higher levels proposed by Gould. Dawkins promotes an almost exclusive focus on genes. Margulis and Sagan favour cells, though I believe that Dawkins is correct when he argues that their view is a special case of his extended phenotype proposal. Mayr accepts a notion of the extended phenotype, and that genes are the units of selection, but still claims that individuals are the agents of selection.

Without being able to prove Dawkins' world view correct, it does seem to make the more persuasive case, that the unit of selection is that which persists, and is replicated, i.e. the gene rather than the body it is contained within. He also makes a strong case that the agents on which selection act are not limited to the bodies, or vehicles, in which those genes travel, but to the whole extended phenotype which the genes affect.

EFFICACY- Diversity amongst genes and the extended phenotypes they generate arises from random mutations in the genes themselves, and symbiogenesis amongst the bodies which genes occupy. As these bodies become more complicated, further mutations may be negatively constrained. Existing body plans may also enhance other directions of mutation. The resulting phenotypic variety affects how likely it is that the genes and gene-groups which express them will be replicated. This process of natural selection drives evolution, limited by numerous constraints and chance events. At a whole of

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[459] Ibid, p. 465, 83, 534-35.
[460] Ibid, p. 191.
[461] Richard Dawkins, *Review of Wonderful Life by Stephen J. Gould* [internet] (Reproduced from the *Sunday Telegraph*, 25th Feb 1990, 1990 [accessed 16 December 2003]).
[462] Francis Steen, "Gould on Adaptationism and Evolutionary Psychology: A Review of Stephen J. Gould, "Evolution: The Pleasures of Pluralism"," *New York Review of Books* 1997.
[463] Dawkins, *Response to Brown*.

planet (Gaia) level, the time lag between biotic evolution and abiotic response may slow the process at key points.

SCOPE- Gould fails to convince his contemporaries that punctuated equilibrium is a fundamentally different phenomenon than that already accepted in the Modern Synthesis. Mayr and Dawkins accept that evolutionary processes go through acceleration and stasis, but believe that the mechanism is still natural selection of micro mutations and symbiogenesis. The phenomenon of catastrophic events, even global catastrophes, is accepted by all and is now textbook orthodoxy. Gould sees it as part of a temporal continuum, Mayr and Dawkins see it as a non-Darwinian event after which Darwinian processes resume.

So, at a small time scale, random mutation usually produces gradual changes, supplemented with symbiogenetic fusions. When viewed from a larger time scale, evolutionary progression is less smooth, with periods of stasis interspersed with geologically rapid changes. At its most extreme, cataclysms such as massive asteroid strikes and widespread volcanic activity may change the environment so rapidly that almost all life is extinguished, after which body forms may be able to radiate into the numerous empty niches. Life as we see it is the result of an interplay between gradual processes and global traumas.

8.2.3 Does God guide evolution?

So we now have at least a rough sketch of the mechanisms of evolution, the scale over which they work, and what it is that they work on. One mechanism only briefly mentioned was the possibility of divine activity. Has and does God influence the course of evolution? Is there, alongside the very limited, mechanistic orthogenesis which the above authors accepted, a *theistic orthogenesis*, in which God[464] guides life to a desired end state? Such orthogenesis would be *forward looking*, or teleological, in distinction from natural selection and mechanistic orthogenesis. Do the evolutionists considered above see any evidence of forward looking orthogenesis?

In this discussion, I will be considering only the possibility that God guides evolution, not theological alternatives to evolution, such as the creationist theories. Creationists do not fit into Gould's framework, since they reject the common ancestry of all organisms and, in the case of young earth creationists, almost every other Darwinian assumption. I agree with Mayr that the claims of creationists have been thoroughly refuted[465], as do all the other scientists mentioned above. I do not, therefore, consider it fruitful to revisit creationism in this thesis[466].

I am also simply assuming the existence of God. The scientists I have surveyed above do not agree as to whether this is likely. Indeed, they cover the full spectrum of belief, from an apparently positive assessment in Zimmer[467], through the back-handed agnosticism of Margulis and Sagan[468], to the atheist leanings of Gould[469], and the absolute atheism of Dawkins[470]. What they agree upon is that,

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[464] The newest advocates of forward looking, or prescient orthogenesis do not necessarily argue that God is the mechanism, but simply "an intelligence" (Zimmer, *Evolution*, p. 325.) This appears to be more a politically motivated attempt at hair splitting than a real attempt to say that there is an intelligent designer in the universe who is not God.
[465] Mayr, *What Evolution Is*, p. 297.
[466] On becoming a Christian the year after completing my B. Sc. (Hons) in zoology and genetics, I was a creationist for several months. I even had discussions with the Creation Science Foundation about doing a PhD on possible links between fossil-record giantism and changing O_2 levels. To help me decide whether to, I spent weeks of my summer holidays (!) in the Adelaide University library looking up all of the references to scientific articles I was reading in creation science literature. I concluded that the authors I was reading were either consistently incompetent or dishonest in their use of the material they cited. My first year of study at theological college removed the last vestiges of a theological need to defend biblical literalism.
[467] Zimmer, *Evolution*, pp. 337-38.
[468] Margulis and Sagan, *Acquiring Genomes*, p. 26.
[469] Gould, "Nonoverlapping Magesteria," pp. 19-22.
[470] Richard Dawkins, *Reply to Michael Poole* (Reproduced from *Science and Christian Belief*, **7** (1), April 1995, pp. 45-50, 1995), available from http://www.cis.org.uk/scb/articles/dawkinspoole2.htm.

even if science cannot dis/prove the existence of God, it can tell us a great deal about how God relates to life on Earth, or perhaps more pointedly how God does *not* relate to life.

Despite his personal atheism, Gould accepts that Darwin's concepts of agency and efficacy can legitimately be modified to argue that a higher force "employs" natural selection as its mechanical agent. He also states, however, that he is talking hypothetically, for, "no such defensible scientific hypothesis now exists.[471]" He is convinced that we see contingency, not divine will, in the story of life. Our mammalian ancestors are not the result of planning or guidance, but one of numerous possible alternatives[472]. If this is true of the mammals, then it must be true of us, so that,

> "Darwinian natural selection, offers no solace or support for these traditional hopes about human necessity and cosmic importance.[473]" We are, "glorious accidents of an unpredictable process.[474]"

Dawkins agrees, and states that the belief that humanity is a necessary part of, let alone the pinnacle of, creation has been roundly rejected in scientific circles for at least fifty years[475]. Does any process in evolution require a teleological explanation? For Mayr, "The answer is an emphatic 'No.'[476]" He is convinced that his life's work in the field has shown that Darwinian progress is never teleological[477]. He believes that, "… all observed evolutionary trends can be fully explained as being the result of natural selection.[478]" A major objection to theistic orthogenesis for Mayr is that it should result in a consistent directionality in evolution. However, he claims, "… the palaeontologists showed that all evolutionary trends sooner or later change in their direction or may even reverse themselves.[479]" S. Baldauf documents this phenomenon within the eukaryotes. He demonstrates that earlier evolutionary trees, which placed all of the simple eukaryotes at the base, on the assumption that life forms would gain complexity over time, are false. Instead, eukaryotic evolutionary lines show repeated trends towards both complexity and simplification, and look much more like a groundcover or bush than a tree (figure 2)[480].

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[471] Gould, *The Structure of Evolutionary Theory*, p. 21.
[472] Ibid, p. 1332.
[473] Gould, "Introduction," p. xii.
[474] Stephen Gould, *Life's Grandeur: The Spread of Excellence from Plato to Darwin* (London: J. Cape, 1996), p. 216. Cited, not seen, in Denis Edwards, "Evolution and the Christian God," in *Interdisciplinary Perspectives on Cosmology and Evolutionary Biology*, ed. Mark Worthing, *ATF Science and Theology Series* (Adelaide: Adelaide Theological Forum, 2002), p. 181.
[475] Dawkins, *Review of Wonderful Life by Stephen J. Gould.*
[476] Mayr, *What Evolution Is*, p. 303.
[477] By which he means forward looking, or goal directed.
[478] Mayr, *What Evolution Is*, p. 237-41.
[479] Ibid, p. 89.
[480] S. L. Baldauf, "The Deeps Roots of Eukaryotes," *Science* 300 (2003): p. 1705.

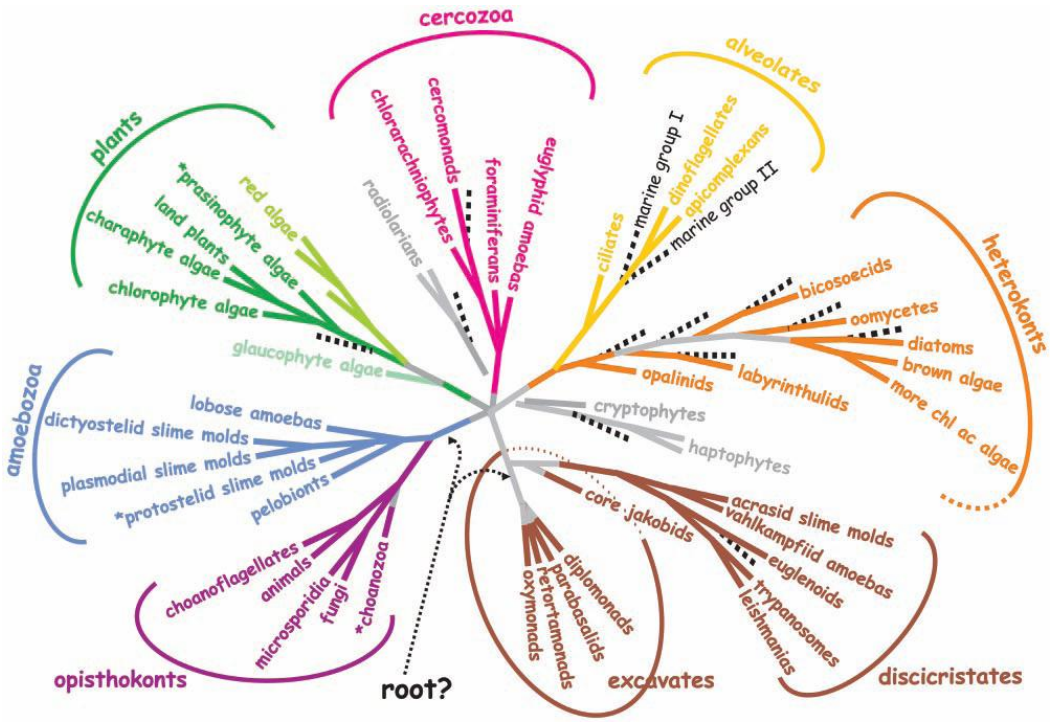

Figure 2. A consensus phylogeny of eukaryotes, according to Baldauf. The relationships look more like a top down view of a groundcover, than the tall, hierarchical trees, in which simple life forms were thought to give way to more complex ones. Animals are part of the opisthokonts, bottom left.

Mayr's final point is that natural selection is really a process of elimination, and it is difficult to see how elimination could have long term goals. In summary, for Mayr,

> "… the frequency of extinction of evolutionary lineages, as well as their frequent changes in direction, is inconsistent with the mistaken claim that selection is a teleological process… Orthogenesis and other proposed teleological processes have been thoroughly refuted.[481]"

After interviewing scores of scientists to produce his text, Zimmer accepts that divine guidance is an unnecessary hypothesis, and favours contingency. He maintains that, "The fate of any new kind of animal [humans included] is far from predictable, often depending on random strokes of luck and good fortune.[482]" Zimmer is adamant that recent attempts to revive the need for an intelligent designer are without merit. He spends several pages debunking Intelligent Design theory, and examines some of its logical inconsistencies. His primary examples are the evolution of antifreeze and blood clotting agents in blood, both of which have been claimed to be irreducibly complex[483]. Zimmer complains that when the intelligent design proponents' "proofs" are explained in other ways, they are able to simply posit the need for design at the previous step[484]. For example, the supposedly perfect vertebrate eye was long held to be evidence for the need for a designer. The evolution of the eye, which happened at least forty times amongst the different animal lineages[485], has now been plausibly explained biologically[486]. Equally significantly, the vertebrate eye is riddled with imperfections[487], hardly the type of organ which points to a perfect, or even particularly intelligent designer.

Intelligent Design advocates have retreated from the design of organs to earlier stages in evolution. Michael Behe, for example, who is a leader in the Intelligent Design movement, focuses on cells. According to Zimmer, Behe speculates that the first cells may have contained all of the DNA needed to make every organism which would evolve. Evolution, then, would consist in the turning off and perhaps removal by mutation of unnecessary genes, not the creation of anything novel[488]. Zimmer simply quotes the response of Allen Orr, "This notion leaves so much of molecular evolution unexplained that it's hard to know where to start.[489]" This rebuttal is not completely devastating, since Behe's speculations about the first cell are presented as a speculative scenario to illustrate an unrelated point. Behe's main argument is that cells contain a mixture of designed and evolved elements[490]. Even so, he is still vulnerable to Orr's main criticism, which is that Behe ignores the evolutionary processes by which initially beneficial developments in the cell subsequently become essential, because other process come to rely on them. Orr points out that irreducible complexity does not at all imply the need for design. The Darwinian mechanisms by which irreducibly complex features evolve were worked out in considerable detail as early as 1939, by the Nobel prize winning geneticist Muller[491].

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[481] Mayr, *What Evolution Is*, p. 130-34.
[482] Zimmer, *Evolution*, p. 117.
[483] Ibid, pp. 325-29.
[484] Ibid, pp. 325-31.
[485] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, p. 72. It was Mayr and Salvini-Plawen who originally showed this to be so in 1977.
[486] Margulis talks about the role of symbiogenesis in the evolution of the vertebrate eye (Margulis and Sagan, *Acquiring Genomes*, pp. 203-4.) Dawkins explains why even a poor eye is better than no eye, and discusses the computer modelling which suggests that a good vertebrate eye could evolve in less than 500,000 years (Dawkins, *River out of Eden*, pp. 76-83.)
[487] Zimmer, *Evolution*, p. 128. He also includes the evidence of biologist George Williams, who bluntly states that the eye is "stupidly designed." (Zimmer, *Evolution*, p. 129.) See also Dawkins, *The Extended Phenotype*, p. 38.
[488] Michael Behe, *Darwin's Black Box* (New York: Free Press, 1996), pp. 227-28. cited in Zimmer, *Evolution*, p. 331.
[489] H. Allen Orr, *Darwin V. Intelligent Design (Again)* [internet] (Boston Review, 1997 [accessed 27 January 2004]), available from http://bostonreview.net/BR21.6/orr.html#6. Cited in Zimmer, *Evolution*, p. 331.
[490] Behe, *Darwin's Black Box*, p. 206-08.
[491] Orr, *Darwin V. Intelligent Design (Again)*. In a gentler, but no less firm, criticism from the theological camp, Peterson concludes that Intelligent Design is, for a number of reasons, more driven by an ideological rather than scientific program (Gregory Peterson, "The Intelligent-Design Movement: Science or Ideology?," *Zygon* 37, no. 1 (2002).)

Dawkins believes that the hypothesis of God's guidance of evolution is disproved by science[492]. In a quite entertaining passage he reflects on what God must be like if, indeed, God *did* actually guide evolution or design life. He notes that cheetahs appear to be well designed to kill antelopes. At the same time, antelopes appear to be well designed to escape cheetahs. He concludes,

> "It is as though cheetahs have been designed by one deity and antelopes by a rival deity. Alternatively, if there is only one Creator who made the tiger and the lamb, the cheetah and the gazelle, what is He playing at? Is he a sadist who enjoys spectator blood sports? Is he trying to avoid overpopulation in the mammals of Africa? Is he maneuvering [sic] to maximize David Attenborough's television ratings?[493]"

So, if antelopes and cheetahs and other bodies are not there because God made it so, *why are they*? I will shortly give a brief account of the development of bodies. But in terms of the *cause* of bodies in the absence of Divine guidance, Dawkins has the most to say. The answer to the question, *Why are we here* is that we are the vehicles which evolved to enable DNA to replicate. Religions often follow the *Why are we here* question with, *Why do we suffer?* Dawkins' answer is that we have not been directly designed by a loving God who would (we assume) therefore want to minimise suffering. We have been created by our DNA, which is indifferent to anything other than its replication (and is, strictly speaking, indifferent even to that)[494],

> "So long as DNA is passed on, it does not matter who or what gets hurt in the process…. Genes don't care about suffering, because they don't care about anything. If Nature were kind, she would at least make the minor concession of anaesthetising caterpillars before they are eaten alive from within. But Nature is neither kind nor unkind. She is neither against suffering nor for it… The total amount of suffering per year in the world is beyond all decent contemplation… thousands of animals are being eaten alive; others are running for their lives, whimpering with fear; others are being slowly devoured from within by rasping parasites; thousands of all kinds are dying from starvation; thirst and disease. It must be so. If there is ever a time of plenty, this very fact will automatically lead to an increase in population until the natural state of starvation and misery is restored.[495]"
>
> "In a universe of blind physical forces and genetic replication, some people are going to get hurt, other people are going to get lucky, and you won't find any rhyme or reason in it, nor any justice. The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind pitiless indifference.[496]"
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> "DNA neither cares nor knows. DNA just is. And we dance to its music.[497]"

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[492] Richard Dawkins, *The Emptiness of Theology* [internet] (Reproduced from *Free Inquiry*, **18**(2), Spring 1998, p. 6, 1998 [accessed 16 December 2003]), available from http://www.world-of-dawkins.com/Dawkins/Work/Articles/emptiness_of_theology.htm.)

[493] Dawkins, *River out of Eden*, p. 105-06. I said that I was ignoring creationism, but in the margins of this quote from Dawkins the battle lines were clearly drawn by an anonymous protagonist in pencil, "In God's creation the lion can lie down with the lamb- but not so in this world of sin. The purpose of God's creation was different to the way things are- this is because of the Fall of man and sin in the world." I could not resist adding a post-it note, "Lions and lambs and all sorts of parasites *predate H. sapiens* by 00s of millions of years. The lion never did and never will lie down with the lamb, or the world would be overrun by sheep! Isaiah was a poetic prophet, not a zoologist (& he knew it)". Just had to get that off my chest- sorry.

[494] Dawkins is clear that the "selfish" gene is just a metaphor, which can lead to misunderstandings if people do not firmly grasp the limitations of personification. The gene acts as if it were selfish, but of course has no mechanism by which to feel anything at all (Dawkins, *Unweaving the Rainbow*, p. 233.)

[495] Dawkins, *River out of Eden*, p. 131-32.

[496] Ibid, p. 133.

[497] Ibid. I will examine the extent to which DNA, or evolution, controls our actions in the chapter 8.2.5, on morality.

A final reason to doubt that God is guiding evolution on Earth towards a particular end emerges when we consider just what that end will be, but for that we will have to wait until we consider the future of the image of life in chapter 8.2.9.

To this point in my investigation of evolutionary theory, we have seen the massive sweep of geologic time over which the story unfolds. We explored the limits of agreement about the mechanisms by which life emerged and evolved, noting that there is no evidence that the process was guided by an intelligence. It was, rather, guided by processes completely indifferent to us, except as breeders, or gene transmitters. As Dawkins points out, every single ancestor, of every single one of us, bred before they died[498]. Before responding to this view of life, which some see as bleak, I shall offer a brief survey of what these evolutionary processes have created. It will be necessary to select just a few highlights from the past three and a half billion years.

8.2.4 Highlights of the evolutionary story

8.2.4.1 The origin of life

According to Margulis and Sagan, living systems are not ontologically different from non-living ones. Complex systems, including simple life forms, arose in response to the numerous chemical and energy gradients around them. They were the natural consequence of their ability to bring complex systems to equilibrium. Life is explained by its greater efficiency in reducing gradients.[499] In an earlier work Margulis outlined what she believed to be a plausible sequence for the evolution of anaerobic bacteria[500], adding to the other five of six major theories about the evolution of life. Mayr believes that although none are *entirely* satisfactory, several are highly plausible, and the problem of the emergence of life from non-life is now no longer as formidable as it once seemed[501].

Richard Southwood offers one possible story[502]. Rather than speculate about gradients as mechanisms, he outlines the, "hard scientific evidence about how simple organic molecules have been formed." He then looks at the evidence which leads to "informed speculation" about the transition from molecules to simple cells[503]. First, the necessary molecules were concentrated, perhaps in hot oceans, near larval flows, on bubbles or clay particles. Secondly, these molecules joined into more complex polymers, which must have happened in areas of high pressure. Some molecules may also have arrived as space debris. Thirdly, an outer membrane formed which allowed a different chemistry to exist inside it than existed in the surrounding medium. Membranes are known to form spontaneously in certain situations, such as that which exists in hydrothermal vents and hot springs. Fourthly, a mechanism to provide energy developed, beginning with glycolysis, which is still the basic pathway in most organisms today. This would have eventually ended, and all life died, if not for the evolution of photosynthesis. Ironically, the oxygen by-product which we now depend on wiped out almost all life on the planet at the time. Finally, a mechanism emerged which permitted the replication of these cells, based on nucleic acids. It is likely that RNA appeared first, probably in hot acidic sulphur-laden waters.

The incessant transfer of genetic information amongst these early cells through symbiogenic fusions eventually lead to the eukaryotes. We eukaryotes had very humble beginnings, as we were still single cells, but we had a nucleus and chromosomes. These two features allowed the prolific experiments in multicellularity to begin[504].

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[498] Ibid, pp. 1-2.
[499] Margulis and Sagan, *Acquiring Genomes*, pp. 47-49.
[500] Margulis, *Origin of Eukaryotic Cells*, pp. 84-101.
[501] Mayr, *What Evolution Is*, pp. 45-46.
[502] Southwood, *The Story of Life*, pp. 12-13. His story does not necessarily contradict Margulis and Sagan, he may be describing the mechanisms by which their overarching process came about.
[503] Ibid, pp. 11-12.
[504] There are at least thirty significant differences between prokaryotes and eukaryotes, which Mayr summarises (Mayr, *What Evolution Is*, p. 50.) He points out that bacteria may be multicellular, but they have never expressed anything like the

8.2.4.2 The development of multicellular life

Dawkins explores reasons why multicellularity arose in the first place, though he does not offer a definitive hypothesis[505]. He rightly states that most of us simply assume multicellularity, and the existence of organisms, as if it is obvious. From his gene-level point of view, however, it is not immediately obvious why genes should replicate in bodies rather than remaining free-floating. The gene-level story is that replicators in multicellular bodies achieve complex organs and behaviour patterns which offer great selective advantage. In practice, the organism is simply a manifestation of the extended phenotype - the expression of genes, and "has arisen as a partially bounded local concentration, a shared knot of replicator power." Although not denying the importance of organisms[506], Dawkins wants us to see them for what they truly are in evolutionary terms, vehicles by which genes replicate[507]. His story goes much further than this, but we will return to it at the end, and continue to think about the bodies with which we are familiar. Even if we reject Dawkins' entire project, the story of the evolution of bodies has profound theological implications.

8.2.4.3 The evolution of sex

The next significant step for eukaryotes was the evolution of sexual reproduction. Its success as a strategy is seen in the fact that nearly all eukaryotes reproduce sexually. Yet there has been no simple progression from asexual to sexual reproduction, since those that now reproduce asexually are not more primitive forms, but have forsaken sexual reproduction and returned to asexuality. The near ubiquity of eukaryotic sexuality has puzzled scientists for over a century[508]. Sexual reproduction is more difficult, slower, more dangerous and more costly. Sexual reproduction means that each parent only passes on half of their genome to their offspring. Asexual organisms can reproduce at will, with little risk, and pass on their entire genome. Why, then, go to all the trouble? Why has natural selection not eliminated such a costly process?

The answer almost surely lies in the major difference between sexual and asexual reproduction. In the latter, the only source of genetic variation comes from mutations, which will often be deleterious. In sexual reproduction, the genotypes of two individuals are "shuffled," leading to great phenotypic variability in the offspring. This variability means that, in the event of a major change in the environment, it is likely that at least some individuals will have the phenotype necessary to cope, or thrive. Sex, in other words, is all about promoting diversity to cope with a changing environment.

The most significant change in the environment, it seems, is that caused by pathogens[509]. Sex is largely a selective response to disease and parasitism. Multicellular asexual organisms evolve only very slowly, with random mutation the driving force. Consider the production of a gamete in sexual reproduction. First, each maternal chromosome aligns in the cell with its paternal equivalent. Crossing over then occurs, in which the aligned chromosomes swap random segments. In other words, each maternal and paternal chromosome now contains parts of the other. Secondly, the cell divides into two gametes, each of which will end up with either the mostly maternal, or mostly paternal chromosome. In this process every gamete produced by an organism will be genetically unique, and so the next generation of organisms will contain great diversity. This means that at least some of the next generation will likely be genetically resistant to any pathogen which confronts them, and these

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amount of differentiation within each multicellular whole that eukaryotes have (Mayr, *What Evolution Is*, pp. 53-54.) See also Margulis & Sagan on the common multicellularity of prokaryotes (Lynn Margulis and Dorion Sagan, *What Is Life?* (New York: Simon & Schuster, 1995), p. 71.)

[505] Dawkins, *The Extended Phenotype*, pp. 250-64.

[506] Dawkins, *The Selfish Gene*, p. 234.

[507] Dawkins has been frequently misunderstood as being a genetic determinist, who believes that we are *only* our genes, and that our genes completely control us. He addresses this at some length in Dawkins, *The Extended Phenotype*, pp. 9-29.

[508] Mayr, *What Evolution Is*, p. 115.

[509] Ibid, p. 116. See Zimmer, *Evolution*, p. 229ff. for an extended treatment of the subject. The next few paragraphs are based on Zimmer's extensive treatment of sex.

will go on to produce more offspring for the next generation. As the pathogen mutates, the genetic diversity of the host species means that some in each generation will usually survive.

Sexual reproduction arose long before gender. All sex was initially homosexual[510]. Organisms released haploid gametes, which fused into diploid cells, and grew into multicellular organisms. It is proposed that the gametes were simply released into the water in much the same way as sponge gametes are today. However, this wide dispersal made it likely than many gametes would be wasted. Natural selection favoured life forms in which some retained their gametes, and others dispersed them. Many of course did both, especially amongst the plants. Our ancestors, however, continued to specialise reproductive strategies to the point where two distinct genders arose, leading to the existence amongst mammals of females (XX) and males (XY)[511]. The pattern is reversed in birds, where males are ZZ and females ZY.

But the existence of such a significant difference in gamete dispersal within most vertebrate species, according to evolutionary theory, should create different selective pressures on each strategy. For convenience, I will adopt the universal convention of calling those who retain their gametes female, and those who disperse them male. Females retain their gametes, and the resulting zygote, and can therefore be sure that the zygotes developing within them are genetically half "theirs[512]," which is a tremendous advantage. At the same time, they often need to provide nutrients to the developing embryos, and may be less mobile whilst doing so. They also often offer protection to the young for a time, at considerable risk to themselves. Males can never be sure that their sperm has fertilised any given eggs, but since sperm production and dispersal is relatively easy, they can increase their chances of having offspring by mating frequently, and with multiple partners.

Zimmer provides numerous examples of the strategies employed by males and females to increase the probability that their genes pass into the next generation. They compete not only with each other, but with members of the same gender for access to each other. To take just one example, many males have preejaculate with a cocktail of chemicals designed to poison any sperm already in the reproductive tract[513]. Others have a variety of appendages to scrape semen out. Females are just as proactive in this evolutionary race. Hens will eject semen if a subordinate rooster mates with them[514]. They prefer roosters with engorged combs, but this requires high levels of testosterone, which leads to premature death. It also increases susceptibility to parasitism, so only very health roosters can sustain it[515]. Indeed, a large amount of female selection of males is thought to distinguish the healthy from those suffering from pathogens. Female hens, then, are selecting for good pathogen resistance in their partner, and thus offspring, which gives them an increased chance of survival[516].

Male lions, when taking over a pride of unknown lions, often kill any cubs, since none of them will be genetically related. If, however, there are enough lionesses present, they can defend the cubs, thus preserving their own genes[517]. When lionesses do mate, they copulate hundreds of times in a few days with the dominant male, ovulating only near the end. Only a healthy male, not overburdened with pathogens, is likely to last the distance and so fertilise the female. The females then mate with all the other males briefly, so that all have reason to believe they may be the father, and thus not kill the cubs if they take over the pride in which they have lived for a time. There is some evidence that this sort of

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[510] Well, it was unisexual or asexual, but since there was only one gender we can playfully call it homosexual, significantly undercutting the claim of many Christians that God created the world heterosexual, and homosexual is an unnatural deviance.
[511] Gender is more plastic than this, for example there are individual mammals with XYY and XXY chromosomes. Although they are infertile, if they are members of a social species, such as humans, they may contribute to the care of related individual's offspring, and thus enhance the future transmission of their genes.
[512] It is actually slightly more than half, since the mitochondrial DNA always comes from the mother.
[513] Zimmer, *Evolution*, p. 240.
[514] Ibid.
[515] Ibid, p. 238.
[516] Ibid, p. 237.
[517] Ibid, pp. 246-7.

male strategy persists in primates, and possibly unconsciously in humans[518]. This is quite possibly, however, an artefact of the extremely stressful situations in which the study populations now live[519].

We do know that in species where males contribute to the care of young they are uncannily able to detect offspring that are not theirs[520]. This is thought to be why human babies tend to resemble their father's lineage initially. The stories of species once thought to be monogamous, but now discovered to be otherwise are legion. As Zimmer puts it, "Promiscuity is rampant in the animal world, even in species that generations of scientists had been convinced were utterly faithful,[521]" even though they may live monogamously. For example, amongst birds, though 90% of species are monogamous, up to 55% of chicks are the product of clandestine liaisons, depending on the species. In humans, a study performed in World War Two on something completely unrelated revealed that 25% of children were illegitimate[522].

The concept of illegitimacy is itself a very recent invention, being irrelevant in our ancestral, nomadic groups, where there was no property to speak of[523]. According to Malcolm Potts and Roger Short, human sexual dimorphism and our relatively large penises and testicles, among other things, betray the tendency to promiscuity in our past, in which males used their physical bulk to fight off rivals and ejaculated masses of semen in an attempt to "drown out" the competitors. When we entered an agricultural mode of being in our recent past, more stable relationships developed so that each individual could be connected to a family, and thus their right to access of land and resources calculated and inherited. According to Potts, marriage, "is the badge of a polygamous animal struggling to be monogamous.[524]"

Clark accepts Pott's final conclusion, but was unimpressed by the reasoning he used along the way. She points out that in humans, sexual dimorphism is remarkably *small* relative to other apes, and male and female attitudes to sex and relationships are very similar, despite popular media reports to the contrary[525]. Under the influence of the popular media we may have read Potts quote about marriage as saying it is, "the badge of a polygamous *male* struggling to be monogamous." This would only be true if (as for many animals), sex only occurred when the female was fertile, usually led to pregnancy, and the biological parents bore the burden of caring for the progeny. The first two are not true for humans anywhere, and none are true for humans in many "traditional" societies. None of them have been true for at least some primates, including our ancestors, for a very, very long time.

Clark agrees with Potts that "marriage" arose as small human communities needed to grapple with the concept of property and access to resources. As evidence she points out that in extant nomadic groups sexual relations are relatively uninhibited, and monogamy absent. The whole community, or at least several males, help raise each child[526]. She suspects that fairly casual sex amongst members of each small community was probably the dominant form of social structure from the nomadic present all the

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[518] Malcolm Potts and Roger Short, *Ever since Adam and Eve: The Evolution of Human Sexuality* (Cambridge: Cambridge University Press, 1999), pp. 215-16. They report that human stepfathers, for example, are sixty times more likely to kill an infant under two with whom they live than a biological father is.
[519] Mary E. Clark, *In Search of Human Nature* (London ; New York: Routledge, 2002), pp. 90-91. Even in captivity, where conditions are crowded but the fear of poaching is absent, male gorillas are rarely hostile to females or infants. The human infanticide study was in western, nuclear family based studies. In many human communities males freely share the care of non biologically related infants.
[520] Zimmer, *Evolution*, p. 247.
[521] Ibid, p. 240.
[522] A stupid word which says more about the person who coined it than the people it describes. The WWII study is mentioned in Potts and Short, *Ever since Adam and Eve*, p. 85.
[523] Ibid, p. 92, 211.
[524] Ibid, p. 82.
[525] Clark, *In Search of Human Nature*, pp. 239-40.
[526] Ibid, pp. 241-43.

way back to the Pleistocene, and even further if we include our primate ancestors. We may be getting a good glimpse of our ancestral sexuality in the sexual behaviour of chimpanzees and bonobos[527].

Chimpanzees and bonobos are genetically almost identical, but are geographically isolated. The former live in areas where survival requires foraging over large ranges, so that females spend little time together and care for offspring alone, whereas males regularly group together to defend territory and hunt. The result is an aggressive society where males dominate and compel females to have sex. This may be caused by the increasing pressures being placed upon chimpanzee colonies by recent human activity. Bonobos, in contrast, live in areas where food is easy to come by, and females spend much time in each other's presence. They are therefore easily able to repel unwanted advances by the males. Far from becoming a less sexed community as a result, bonobos are extremely promiscuous, both hetero and homosexually, but without the jealous violence often exhibited in chimpanzee colonies. Further evidence that environmental factors, rather than any genetic difference is the root cause, is seen in the much stronger female bonding of captive chimp populations, where food is plentiful, and females protect each other from male aggression[528].

We might take as a clue from this that humans, who are genetically so similar to chimpanzees, and share many cultural similarities[529], will exhibit different sexual practices in different conditions, with jealousy and violence not being the inevitable result of male desire to guarantee parenthood, but the symptoms of societies under stress. It is highly significant that chimpanzees were known and studied long before bonobos. As Frans de Waal, a primatologist, says,

> "Had bonobos been known earlier, reconstructions of human evolution might have emphasized sexual relations, equality between males and females, and the origin of the family, instead of war, hunting, tool technology, and other masculine fortes.[530]"

It is also probably significant that the Western humans who studied them were the product of very stressful industrial environments far removed from the Pleistocene era in which their brains and basic emotional responses evolved.

The plasticity of human sexuality is even more pronounced than what we witness amongst chimps and bonobos. Even as agriculture and property brought an end to the fairly free exchange of sex,

> "The creative solutions of many traditional societies to coping with sexual passion without disrupting social order put modern Western attempts to legally and morally fuse the two to shame, as distinctly unimaginative, not to mention, unrealistic.[531]"

So, in many and various ways we and our primate ancestors have come together for sex, for fun. Every now and then sex leads to pregnancy. For about nine months the expectant mother's body does everything that her mammalian ancestors have been doing for tens of millions of years, with about as little trouble. Then, however, the baby needs to get out!

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[527] The next two paragraphs reflect a summary of chimp and bonobo behaviour found in Zimmer (Zimmer, *Evolution*, pp. 252-56.)

[528] Frans de Waal, *Good Natured : The Origins of Right and Wrong in Humans and Other Animals* (Cambridge, Mass.: Harvard University Press, 1996), p. 168.

[529] From his years of research de Waal concludes that there are, "points of fundamental similarity, but not identity between chimp culture, language and politics." (Ibid, p. 211.)

[530] Frans de Waal and Frans Lanting, *Bonobo: The Forgotten Ape* (University of California Press, 1997), p. 2. Clark cites this on page 94. This equality would have included the fact that both males and females enjoy sex and the benefits of promiscuous sex (de Waal and Lanting, *Bonobo: The Forgotten Ape*, pp. 105,12.) The myth of seed-sowing males being trapped by nest making, intrinsically monogamous females may have *some* truth to it generally, but only *much* truth in societies where males and females are usually separated and community fragmented, so sexual encounters are less easy to arrange, women rely on men for income, and are forced to care for any offspring they may have alone.

[531] Clark, *In Search of Human Nature*, p. 244.

8.2.4.4 *H. Sapiens*: birth and other compromises

In *H. sapiens*, almost uniquely, women endure one of the two most painful experiences known to humans, the other being the passing of kidney stones. The authors of Genesis and the oral traditions that preceded them grappled with the questions raised by the pain, and occasionally death, associated with human childbirth[532]. Their solution was to blame the fact on female disobedience,

> "Then the LORD God said to the woman, "What is this that you have done?" The woman said, "The serpent tricked me, and I ate… To the woman [God] said, "I will greatly increase your pangs in childbearing; in pain you shall bring forth children...[533]"

Logically, of course, in the story the blame finally lies with God. Humans may have sinned, but God chose the punishment. There has been an abundance of theological deliberation about the justice or otherwise of a God who would do such a thing. Fortunately, evolutionary biology brings an end to the need for the discussion. The "blame" for the emergence of difficulties in childbirth lies not with rebellion, nor God, but the move towards a bipedal lifestyle and the corresponding changes in the pelvis[534]. The subsequent increase in the cranial size of *H. sapiens* made birth much worse. Birth is, it seems, a compromise between our evolving brain size and the limitations of the body type evolution has bequeathed to human women. Human babies are, relative to our nearest ancestors, born with great difficulty and extremely prematurely. Full human gestation, if head size was not an issue, would be about 21-26 months[535]. Human babies would, then, like our nearest ancestors, actually be able to assist in the birthing process, and be much more independent.

Perhaps human birth difficulties *are* the result of God's design. We could hypothesis that God really is male, and thus little concerned for the intricacies of female anatomy, or perhaps even their pain. This hypothesis is undone by the convoluted way in which the human male urethra passes around the prostate. The result is that an inflamed prostate, which affects at least half of all males, is extremely painful, and sometimes fatal[536]. It could be completely avoided with better anatomical design, but prescient design is not a possibility for natural selection works. S. Jay Olshansky *et al*. detail a considerable list of "design faults" in the human body, primarily ones that become apparent with age. In a somewhat humorous article they make the serious point that,

> "… natural selection… does not aim for perfection or endless good health. If a body plan allows individuals to survive long enough to reproduce (and, in humans and various other organisms, to raise their young), then that plan will be selected.[537]"

Along with "design faults" almost all bodies contain vestigial remnants, or useless anatomical structures. They exist because they were once essential to the survival of the organism's ancestors. For example, some whales still have legs- tiny vestigial ones which are visible only on the skeleton- and some snake pelvises still have small nubs[538]. Such remnants are overwhelming evidence of the common descent of species from ancestral types. They are also evidence of the constraints under which natural selection operates (see page 73, above), which leads to the favouring of organisms who have better phenotypes for a given environment, rather than the best possible of all phenotypes.

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[532] Humans are not totally unique. Domestic livestock do have difficulties, but they have been artificially bred for other traits, of which difficult birth may be a by product. A wild cow with a prolonged labour is an eaten cow. Gorillas and chimpanzees (unknown to the Hebrews) do appear to experience pain in birth, but the labours are much shorter, typically two hours (Potts and Short, *Ever since Adam and Eve*, p. 131.)

[533] Genesis 3:13-16.

[534] The following summarises Southwood, Rosenberg and Trevathan (Karen Rosenberg and Wenda Trevathan, "The Evolution of Human Birth," *Scientific American* 13, no. 2 (2003), Southwood, *The Story of Life*, pp. 225-26.)

[535] Southwood, *The Story of Life*, p. 226. Also Mayr, *What Evolution Is*, p. 274.

[536] S. Jay Olshansky, Bruce Carnes, and Robert Butler, "If Humans Were Built to Last," *Scientific American* 13, no. 2 (2003): p. 99. The lack of reflection on this problem in Genesis may be due to the shorter life spans of most males at the time, which would have saved them from this medical condition.

[537] Ibid: p. 95.

[538] Gould, "Introduction," p. xi.

Hence, primate bipedalism was favoured on the plains of Africa because it enhanced survival overall, even though it led to increased pain, and even mortality in the moment of child-birth.

8.2.4.5 The "falls" of Creation- mass extinction events

Enhancing survival prospects does not ensure survival. There are a myriad of chance events which constantly impact on individual mortality. Superimposed on this sea of contingency are the regular and spectacular mass extinction events which wipe out not just individuals, but entire ecosystems. In the evolutionary story of life, Earth's biodiversity has "fallen" at least five times[539]. Life as we know it is totally dependent on death, and lots of it.

The first mass extinction probably occurred about 2000mya, when oxygen producing microbes evolved[540]. Ironically, given that oxygen is essential for most organisms now living, it was fatal to the anaerobic microbes that then covered the planet. Their almost total extinction paved the way for the aerobes like us. Sagan and Margulis point out that *this* event, not the one we are currently experiencing, was the first species driven mass extinction[541].

Whether initiated by life forms, geological processes or extraterrestrial events, it was the resulting environmental changes which triggered the mass extinctions. Those organisms that perished may have been extremely well adapted to the environment as it was just before the cataclysm. Indeed, "A perfectly adapted species is always in the greatest danger in times of rapid (in evolutionary terms) change.[542]" That is, life did not only evolve by the gradual out competing of 'outmoded' organisms by better adapted ones. It did not evolve by the continual emergence of better designed versions of organisms. Massive cataclysms wiped out the most successful organisms of the time and thus vacated niches for previously less well adapted organisms to take over. A simplified illustration is provided in figure 3[543], which documents the extinction rates of marine invertebrates.

[539] Though never to quite to the extent as that pictured in the stories of the flood and Noah's Ark!
[540] Southwood, *The Story of Life*, p. 24. Also Lovelock, *Gaia (1979)*, p. 109.
[541] Dorion Sagan and Lynn Margulis, "God, Gaia and Biophilia," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993), pp. 349-50.
[542] Southwood, *The Story of Life*, p. 109.
[543] Zimmer, *Evolution*, p. 145.

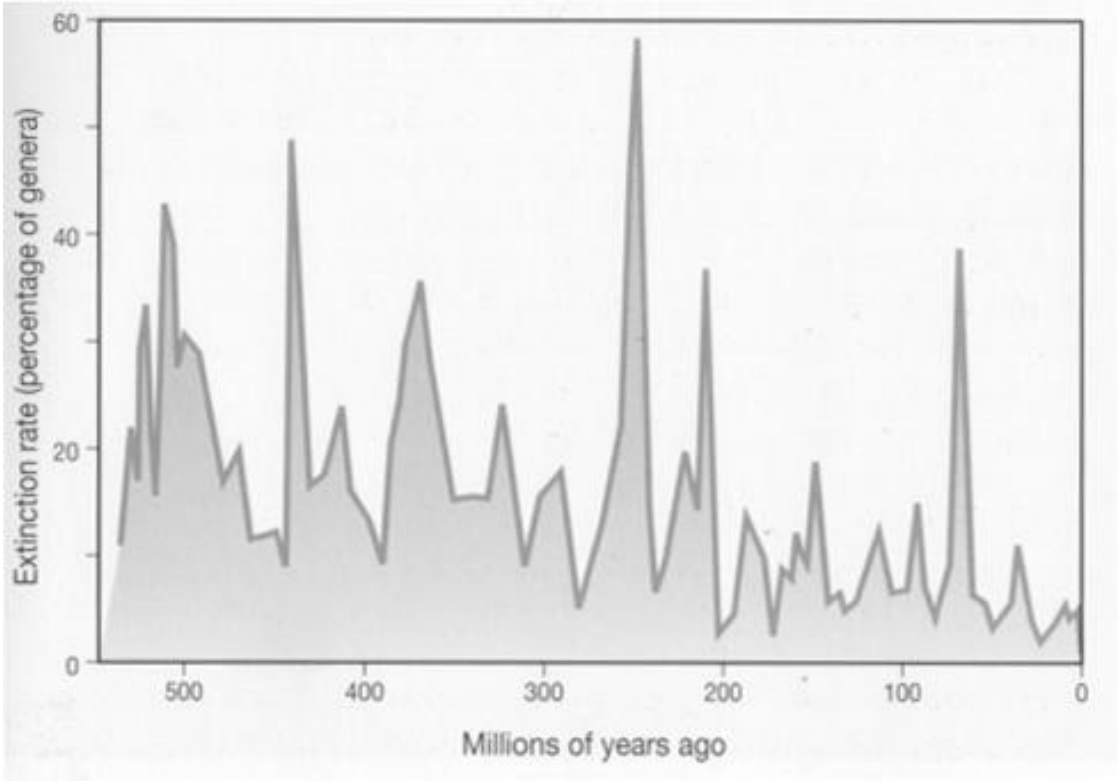

Figure 3. A history of marine invertebrate extinctions. Palaeontologists agree that there were at least five of the larger peaks represent mass extinction events on the entire Earth. The last peak represents the mass extinction event which brought the dinosaurs to an end. Note that this includes only the last 550 million years, before which the data are too sketchy.

Though this documents the timing well, the impact on land animals of some of the extinction events was even more marked. The best known extinction is probably the Cretaceous/Tertiary extinction, which wiped out the dinosaurs. Thirty five percent of mammal species were also wiped out, and seventy five percent of plant species in North America went extinct. Those that could survive did so largely as seeds. Any creatures that were part of a food chain reliant on leaves perished. Until this event, the dinosaurs had been the dominant vertebrates on Earth for a period of 150 million years. In all that time the mammals, far from being more "advanced," were not able to out compete them,

> "We think of mammalness as the superior way to be. It wasn't. Dinosaurs in head-to-head competition won out. They took over the world. We talk about an age of dinosaurs - well, they wrested it away from mammals.[544]"

It was not until a comet slammed into Earth, shrouding it in darkness for several weeks, that mammals got their chance. Small, carrion eating, rat like mammals were able to explode into a variety of body plans to take advantage of the enormous number of ecological niches which were emptied with the death of the dinosaurs[545]. Likewise, the birds finally gained a foothold with the extinction of the pterosaurs[546]. Our ancestors are the vermin who feasted on rotting dinosaur corpses.

The dinosaurs themselves only became numerous after the greatest multicellular extinction event ever, about 250mya. During the formation of the super continent Pangaea, two events combined to wipe out about 95 percent of all marine species, and over half of the families of marine organisms. The two events, which occurred about eight million years apart, was massive volcanic activity around Siberia, and a suspected comet strike[547]. Eight orders of insects disappeared, and the dominance of the early amphibian and reptile types was ended. So extensive were the changes that Southwood concludes, "The wonder is perhaps not that so many species became extinct, but that any survived at all.[548]"

So, then, *H. sapiens* is the beneficiary of the mass extinction of almost all species of life on Earth; between 99 and 99.99% of those that have ever existed are now gone[549]. At the same time, the number of species at any one point in time shows a general increase over time, so that *H. sapiens* arrived at a time of probably maximum biodiversity on Earth[550]. Mass extinctions continued after the evolution of *H. sapiens*, though not yet on as grand a scale as those mentioned above. For the past 10,000 years we have experienced a warm lull in a period of repeated glaciations, which inevitably led to widespread, localised extinctions of humans and other species[551]. A worse catastrophe was the eruption of Mount Toba approximately 70,000 years ago, which shrouded most of the planet in darkness for seventeen years[552]. Many human communities must have perished, their lands recolonised by those groups who were lucky enough to survive.

No species has ever survived for more than tens of millions of years, and most have survived for much shorter periods of time. The average "life expectancy" of a mammalian species is just three million years[553]. This limit may not apply to us, since we (or at least the rich amongst us) have technology like nothing ever before seen on Earth. This technology may help our species persist much longer than three million years. On the other hand, many suggest that it may greatly *curtail* the persistence of our species, by rapidly changing the environment into one unsuitable for our continued habitation. That is,

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[544] Ward P.D., *The end of evolution: On mass extinctions and the preservation of biodiversity*, New York, Bantam 1994, cited in Ibid, p. 157.
[545] Ibid, p. 140.
[546] Southwood, *The Story of Life*, p. 158.
[547] Ibid, p. 117.
[548] Ibid.
[549] Margulis & Sagan propose 99% as a conservative figure (Margulis and Sagan, *Acquiring Genomes*, p. 52.); Mayr believes that the figure is at least 99.99% (Mayr, *What Evolution Is*, p. 155.)
[550] Zimmer, *Evolution*, p. 169.
[551] Clark, *In Search of Human Nature*, pp. 107-13.
[552] Ibid, p. 115.
[553] Margulis and Sagan, *What Is Life?* , p. 177.

we are presently in the midst of another mass extinction event. How does this one compare to those which preceded it?

8.2.4.6 The human initiated "fall" in the context of preceding ones

> "Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about...[554]"

So said a coalition of 1,700 scientists from around the world, including the majority of science's Nobel laureates, in 1992. Five years later, the coalition had this to say,

> "Addressed to political, industrial, religious, and scientific leaders, the Warning demonstrated that the scientific community had reached a consensus that grave threats imperil the future of humanity and the global environment. However, over four years have passed, and progress has been woefully inadequate. Some of the most serious problems have worsened. Invaluable time has been squandered because so few leaders have risen to the challenge.[555]"

After a very protracted labour the Uniting Church was born in 1977, in the midst of the growing awareness of an ecological crisis. The reality of the crisis was well enough acknowledged for Lynn White to simply assume its existence when laying the blame for it on Christianity[556]. As we saw in chapter 6, every document produced by the Uniting Church which mentions creation acknowledges some level of crisis, and calls on its members to do something about it.

We have seen that at least five times in history life on Earth has been subjected to massive extinction events. As Zimmer puts it,

> "Catastrophic waves of extinctions are a reality. They have ripped through the fabric of life, destroying as much as 90 percent of all species on earth in a geological instant. The suspects behind these mass extinctions are many, including volcanoes, asteroids, and sudden changes to the oceans and the atmosphere… once that stress passes a certain threshold, entire ecosystems collapse like a house of cards… it takes millions of years for life to recover its former diversity… life can change for good...[557]"

It is widely accepted that if present trends continue, half of the species on Earth that were present before the industrial revolution will be extinct within 100 years[558]. Is this latest, human mediated, extinction event any different from the ones that precede it? Yes and no.

1. Previous events have often occurred as the result of numerous interacting factors spread over hundreds of thousands or millions of years - still a geological instant, but orders of magnitude slower than the human initiated event. For example, the "geological instant" of the Permian-Triassic extinction occurred over approximately 150,000 years.

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[554] Union of Concerned Scientists, *World Scientists' Warning to Humanity* [web document] (1992 [accessed 14 June 2002]), available from http://www.ucsusa.org/about/warning.html.
[555] Union of Concerned Scientists, *World Scientists' Call for Action* (1997 [accessed 14 June 2002]), available from http://www.ucsusa.org/about/callforaction.html.
[556] White, "The Historical Roots of Our Ecologic Crisis."
[557] Zimmer, *Evolution*, p. 144.
[558] Ibid.

2. Previous events happened when parts of the world were more isolated form each other, and heterogeneous. Under human agriculture, especially agribusiness, the plant world is becoming far more genetically homogenous. The same is true for animals following the explosion of cattle, sheep, chickens and other domestic livestock. Humans also provided easy transport for a few animal species which have become highly successful invaders, displacing significant numbers of native species. In Australia foxes and rabbits have displaced more than half of our native mammals. Biological invasion on this scale is unique in world history, and equals habitat clearance as a threat to biodiversity[559]. Zimmer points out that extinction of 50% of species over the next century is calculated only by the rate of habitat clearance, and does not take into account biological invasion or climate change patterns. For example, if global warming trends continue, most of the world's reefs could be destroyed in just twenty years[560].

3. Although ninety percent of species were thought to go extinct during the Permian-Triassic event 250 mya, there were far fewer species then to begin with. Biodiversity was at an all time high when *H. sapiens* arrived. A 50% human mediated extinction means many, many more forms of life disappearing than ever before in world history[561] On the other hand, since there *is* so much diversity now, this 50% extinction would return Earth to roughly the same number of species as occurred after the dinosaur extinction (figure 4).

[559] Ibid, p. 191.
[560] Ibid, p. 184.
[561] Ibid, pp. 169.

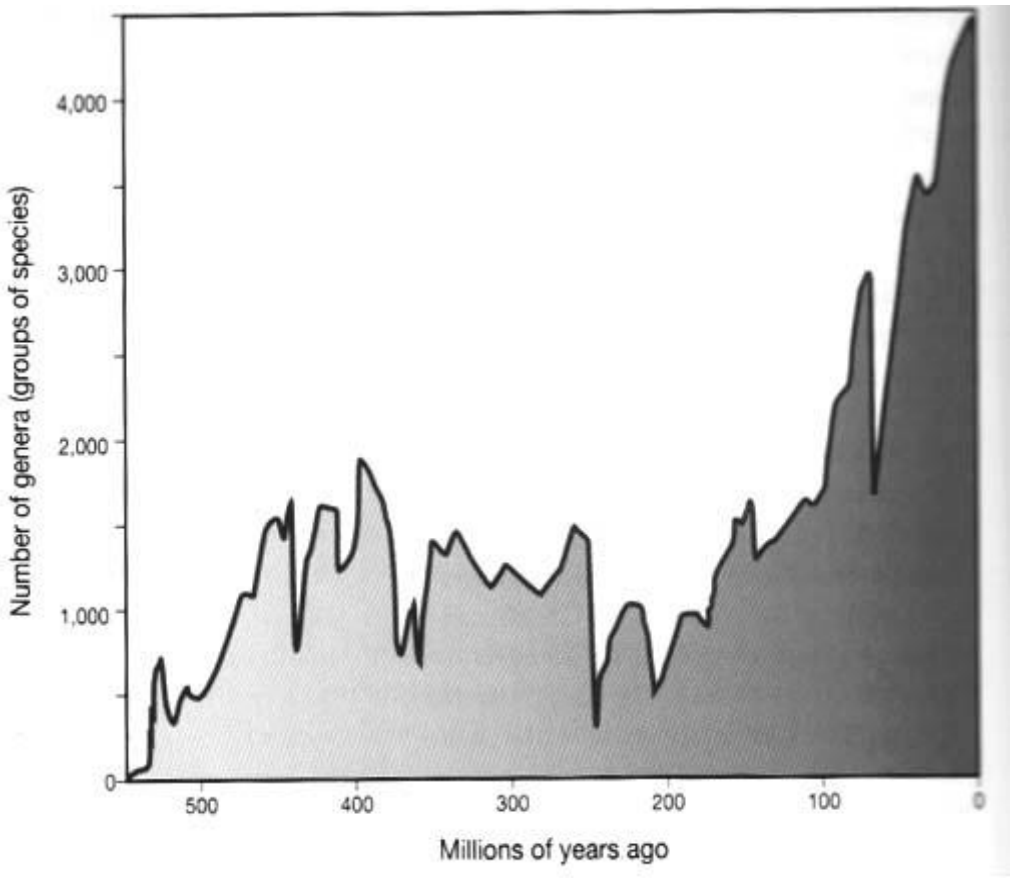

Figure 4. Growth in number of genera over time, a very rough measure of diversity

4. When a comet hits Earth, it only does it once. Volcanos may erupt for years, but they eventually stop. Glaciers come and go. As long as humans somehow manage to survive by the use of technology, there will be no recovery of biodiversity as seen after previous extinction events. This may be exacerbated for a time by the widespread existence of human modified crops and livestock, though eventually they will succumb to pathogens, since there will be enormous selection pressure in favour of any mutant able to exploit them as a resource.

5. This extinction event is being caused by a single, sentient species, not a comet or geological process. Specifically, it is being caused by some members of a single species with the aid of their technology. This species is able, at least theoretically, to change its behaviour and thus ameliorate its impact.

It is also worth noting what may be similar amongst all extinction events, including this one. Firstly, the dominant species at the time of the extinction event tend to go extinct. This may be the end of primates, even of mammals, just like the last event was the end of the dinosaurs. Secondly, it was the superposition of several independent events which caused the mass extinctions. The predicted 50% reduction in species numbers is based on *human activity* alone. However, Earth *will* experience more ice ages, continental drift, volcanic eruptions, and comet strikes. If these follow closely upon the human mediated extinctions, there may be a global collapse of ecosystems, especially as we are making them more homogenous. This could lead to a total extinction of all macroscopic life forms.

Would life eventually recover? That seems certain. Even if every vertebrate and plant was wiped from the face of Earth, most of the microbes, who are the major shapers of our bio systems, would continue to thrive and evolve. Simple eukaryotic organisms would probably survive and continue evolving. Of course the path of evolution would be different, and life would not return to the way it is now. If all vertebrates were wiped out it is unlikely that they would evolve again, at least not with the same basic body plan. Even more likely is the extinction of all primates, and we would not expect to see them ever return. Indeed, the odds of intelligence as we understand it evolving again are probably slim.

There is one prominent metaphor in the campaign to educate people about the present mass extinction event, the *web of life*. It is the key metaphor for those promoting a biocentric perspective in the Uniting Church resources. I shall now consider this metaphor, and two competing claims about the nature of the ecological systems which it describes. Are we looking at a web of cooperative or competitive interactions? Is the web benign (as the Uniting Church resources assume) or malevolent?

8.2.4.7 The story of the Web of Life

The metaphor of a web of life is widely used in ecology[562], to emphasise the interrelationship of all organisms and their abiotic environment. It has featured prominently in environmentalist literature since the beginning of the movement[563]. We have seen that although the web of life has been devastated and repaired itself through geologic history, it is currently being frayed faster than at any time before. What *is* this web of life though? We know that it is a system of ecological interactions, but what is the *nature* of those interactions?

The resources in the Uniting Church have a very positive view of the beneficence of the web. As I demonstrated earlier, they present an image of an ecological system which is *delicate*, *perfectly designed*, *intimate,* interdependent*, beautiful, delightful to God* and *good.* Humans are called to return to their proper place in the web - a place of cooperation for the good of all other species.

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[562] For example Ibid, p. 190.
[563] Donald Worster, *American Environmentalism; the Formative Period, 1860-1915*, *Wiley Sourcebooks in American Social Thought* (New York: Wiley, 1973), p. 9.

This very positive view of the nature of relationships amongst creatures is common in the environmentalist literature[564]. It calls to mind the discredited version of the Gaia hypothesis[565], in which the world is seen as a network of interrelated species which cooperate to build stable ecosystems. In such a view the task of humanity is to remember our place in the web of life and cooperate with other species, rather than standing over against them. Often Indigenous societies are pointed to as reminders of a time when we did indeed live as one with nature[566]. This approach to ecologically grounded ethics persists today. A quick internet search for "nature AND harmony AND cooperation" returned 193,000 references[567]. Scanning the first paragraphs of the first fifty showed that the large majority were advocating the return of humanity to its pre-technological harmony with nature, which is often referred to as a cooperative system of some sort.

A movement which on the face of it assumes and successfully utilises the *cooperative* web of life is Permaculture. This is an Australian born movement for sustainable agriculture of which I am a faltering part. Permaculturalists attempt to grow food in cooperation with the natural processes of Earth, rather than trying to fight and overwhelm them, as broad scale monocultural agriculture does[568]. Permaculture is an excellent introduction to the wider issue of the cooperativeness or otherwise of life as we know it. As Bill Mollison, who coined the phrase permaculture puts it,

> "Permaculture (permanent agriculture) is… the *harmonious integration of landscape and people* providing their food, energy, shelter, and other material and non-material needs in a sustainable way. Permaculture design is a system… which *functions to benefit life in all its forms… working with, rather than against, nature* (emphasis mine). [569]"

> "*Life is cooperative rather than competitive,* and life forms of very different qualities may interact beneficially with one another and with their physical environment… *Cooperation, not competition, is the very basis of existing life systems and of future survival* (emphasis mine).[570]"

Good permaculture systems incorporate dozens to hundreds of food bearing species of plants, interacting with scores of insects and a few vertebrates such as frogs, lizards and chickens. In the edible gardens I helped establish at the University of Queensland we used our knowledge of natural processes to gain a reasonable yield of food with minimal effort and zero use of poisons and artificial fertilizer. But to what extent did we actually *cooperate* with the organisms in the garden? To what extent did *they* cooperate with each other? It became clear to me that we were not simply cooperating with the system as a whole. We were cooperating with those parts of the system that would *bring us benefit*. We planted flowers to make the garden a good place for wasps to live, but only because they would prey on the caterpillars. We planted different species where they would grow best, but only to maximise the yields to us. In other words, the garden was a series of *competitive* systems in which some cooperative alliances persisted because of the mutual advantage they brought the cooperating

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[564] Dawkins labels this the "BBC Theorem" (a little unfairly he admits), as nature documentaries so often speak of the delicate balance of nature, in which every animal plays its part for the good of all, except humans who have stopped cooperating with nature and now threaten its fragile existence (Dawkins, *The Extended Phenotype*, pp. 234-36.

[565] Chapter 8.2.2, page 76.

[566] I have already mentioned sources which suggest that Australian Aboriginal people significantly modified the landscape through the use of fire (page 33). Birch and Diamond also question the romantic attitude of some environmentalists to indigenous relationships to the land, as I will show on page 156.

[567] Search performed February 2004 at http://www.google.com.au

[568] Bill Mollison and Andrew Jeeves, *Permaculture : A Designers' Manual* (Tyalgum, N.S.W.: Tagari Publications, 1988), p. ix.

[569] Ibid. These sentiment continue to be part of the movement, as evidenced by the plagiarism of this paragraph by Geoff Lawton, of the Australian Permaculture Research Institute in 2003 (Geoff Lawton, *Permaculture Defined* (Permaculture Research Institute, c2003 [accessed 13 February 2004]), available from http://www.permaculture.org.au/article.php?articleid=18.)

[570] Mollison and Jeeves, *Permaculture : A Designers' Manual*, p. 2.

parties over against the others. The conscious human participants were consciously selfish - seeking our own gain through the manipulation of other species.

At times we did transcend this selfishness. I found earwigs devastating a bok-choi, and decided to leave them alone because I didn't feel like killing them. We accepted a certain amount of loss of food. But this was only because we could afford to. Permaculture for relatively wealthy westerners like me is a hobby. There was more bok-choi, really cheap, at the supermarket. If I lived entirely off the garden, the earwigs would have perished. Or, perhaps I would have reminded myself that they are good predators of codling moth, and been willing to lose a bok-choi if it meant keeping the apples. But then it would have been my self centred action against the codling moth, not my benevolence, which spared the earwigs.

Permaculture, then, is not really about cooperating with nature, it is about manipulating other organisms to maximise benefit to ourselves. It is about forming cooperative alliances against common threats to resources. It is about recognising that in modern agriculture humans foolishly take on the *entire* ecosystem and fail to see that the short term victories cannot last, as evidenced by increasing top soil loss, salinisation, river pollution, and reliance on poisons and petrochemicals.

Gary Larson, famous for his cartoons about biology, lampooned the human propensity to naively see cooperation in nature[571]. It may be telling that very shortly after it arrived in Australia the book was selling on discount tables for $4.95 rather than the original $24.95 price tag. As Edward O. Wilson said in his foreword to the book, Larson set out to show his readers that nature really is red in tooth and claw, and that,

> "… while it is true that all organisms are dependent on others, the ecological web they create is built entirely from mutual exploitation. Life is tough... what one creature consumes, another must provide![572]"

The web, then, is not *perfectly designed*, but the result of natural selection of competitive organisms. It is certainly *intimate* and *interdependent*, but only because the genes and their bodies are locked in competition for resources. It is not *delicate,* but *robust* because all species, ourselves included, are expendable, and any niche which becomes available will be rapidly filled. A broken strand in the web is quickly replaced.

Is this vision of life so fatalistic that it will discourage us from taking action, action to which ecotheologians unanimously call us? It has not stopped me being involved in all manner of campaigns to reduce our impact on other ecosystems. I note that Wilson concludes his foreword to Larson's book by affirming that, "Nature is to be loved, cherished, admired, and yes, even poetically celebrated," before imploring the reader to watch where they step, and, "be careful of little lives," because we do still, after all, *need each other*.[573]

Do we only care for other creatures because we need them? Are we so cynical? Are our apparently loving and benign actions merely self delusions, a thin veneer pasted over our selfish nature? When we act in ways we consider moral, are we winning a war against our brutish instincts?

8.2.5 Morality emerges from the amoral Web

Dawkins seems to argue that our morality comes from outside evolution, hopefully saving us from its consequences,

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[571] Gary Larson, *There's a Hair in My Dirt: A Worm's Story* (New York: Harper Collins, 1998).
[572] Edward O Wilson, "Foreword," in *There's a Hair in My Dirt: A Worm's Story*, ed. Gary Larson (New York: Harper Collins, 1998).
[573] Ibid.

> "We should try to teach generosity and altruism because we are born selfish[574]… We, alone on earth, can rebel against the tyranny of the selfish replicators[575]."

de Waal argues that in these quotes Dawkins is actually promoting Huxley, not Darwin[576]. Huxley and Dawkins are labelled "veneer theorists" by de Waal, since they present human morality as, "a thin veneer over a brutish nature.[577]" The claim that Dawkins is Huxleyan sparked heated debate on the evolutionary psychology email list in February 2004. de Waal acknowledged that Dawkins claims the selfishness of genes to be just a metaphor[578], which risks misunderstanding by those who do not understand personification[579]. When Dawkins talks about selfishness he is not looking at *conscious* selfishness and altruism, or even subconscious motives, but only on the net effect of the perpetuation of genes[580].

Nevertheless, de Waal is correct in pointing out that Dawkins seems to muddy his own distinctions, and de Waal has reasonable grounds for claiming that the selfish gene model is the, "single most misleading metaphor [in evolutionary biology][581]," especially when Dawkins explicitly endorses Huxley, mistakenly conflating his views on morality with Darwin's, as for example in an interview with Frans Roes,

> "What I am saying, along with many other people, among them T. H. Huxley, is that in our political and social life we are entitled to throw out Darwinism, to say we don't want to live in a Darwinian world… Yes, Darwinism is true, natural selection is the true force that has given rise to life, but we, when we set up our political institutions, we might say we are going to base our society on explicitly anti-Darwinian principles… We have to get our 'shoulds' and our 'oughts' from some other source, not from Darwinism. [582]"

According to de Waal, Huxley and Darwin had very different views on the evolution of morality. Huxley taught that morality does not come naturally to us, indeed, human nature is essentially evil, a product of a nasty and unsympathetic natural world[583]. de Waal and Jessica Flack, his then research assistant, claim that Huxley rejected the power of evolution and biology in the search for morality's origins[584].

Like Dawkins, Huxley's statements appear at times contradictory. Early in his famous lecture on the evolution of ethics, Huxley appears to guardedly accept that there may be evolutionary precedents for morality,

> "[Evolutionary ethicists] adduce a number of more or less interesting facts and more or less sound arguments in favour of the origin of the moral sentiments… by a process of evolution. I have little doubt, for my own part, that they are on the right track... Cosmic evolution may teach us how the good and the evil tendencies of man [sic] may have come about; but, in itself, it is incompetent to furnish any better reason why what we call good is preferable to what we call evil than we had before. Some day, I doubt not, we shall arrive at an understanding of the evolution of the

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[574] Dawkins, *The Selfish Gene*, p. 3.
[575] Ibid, p. 201.
[576] Frans de Waal, email, 9 Feb 2004.
[577] Frans de Waal, email, 10 February 2004.
[578] de Waal, *Good Natured*, p. 14.
[579] Dawkins, *Unweaving the Rainbow*, p. 233.
[580] Dawkins, *The Selfish Gene*, p. 4.
[581] Frans de Waal, email, 11 Feb 2004.
[582] Frans Roes, *Your Can Survive without Understanding. Interview with Richard Dawkins* [internet] (1996 [accessed 1 July 2004]), available from http://www.froes.dds.nl/DAWKINS.htm.
[583] Jessica Flack and Frans de Waal, "'Any Animal Whatever:' Darwinian Building Blocks of Morality in Monkeys and Apes," *Journal of Consciousness Studies* 7, no. 1-2 (2000): p. 1.
[584] Ibid.

> Aesthetic faculty; but all the understanding in the world will neither increase nor diminish the force of the intuition that this is beautiful and that is ugly.[585]"

Huxley rejects both optimism *and* pessimism about the world[586]. On the one hand, he wants to reject optimistic portraits of evolution as leading us inevitably to a better and better future and thus human morality[587]. On the other hand, he is rejecting the attempt to directly translate the apparent "law of the jungle" into human ethics, where the strong should thus be allowed, even encouraged, to trample the weak[588]. He accepts that morality may have evolutionary origins, but rejects the idea that we have evolved to become any more moral than immoral, or that our evolutionary past should be prescriptive for our ethical present. In his preface to *Evolution and Ethics*, he affirmed, in response to ongoing criticism,

> "…the apparent paradox that ethical nature, while born of cosmic nature, is necessarily at enmity with its parent… this seeming paradox is a truth, as great as it is plain, the recognition of which is fundamental for the ethical philosopher. We cannot do without our inheritance from the forefathers who were the puppets of the cosmic process; the society which renounces it must be destroyed from without. Still less can we do with too much of it; the society in which it dominates must be destroyed from within.[589]"

Subsequently, however, Huxley appears to contradict himself, or at least the optimistic element fades, and the need to battle our evolutionary past comes to the fore,

> "*Social progress means a checking of the cosmic process at every step and the substitution for it of another*, which may be called the ethical process; the end of which is not the survival of those who may happen to be the fittest, in respect of the whole of the conditions which obtain, but of those who are ethically the best… *what we call goodness or virtue… is opposed to that which leads to success in the cosmic struggle* for existence. In place of ruthless self-assertion it demands self-restraint… it requires that the individual shall not merely respect, but shall help his fellows… *Laws and moral precepts are directed to the end of curbing the cosmic process* and reminding the individual of his duty to the community (emphasis mine).[590]"

When the first of Huxley's quotes, above, mentions, "those who promote the evolution of ethics," he surely includes his friend Charles Darwin, who had stated,

> "… the first foundation or origin of the moral sense lies in the social instincts, including sympathy; and these instincts no doubt were primarily gained, as in the case of the lower animals, through natural selection.[591]"

Darwin separates this basic morality from the advanced forms, to be found in "civilised society," which he doubted were the result of natural selection,

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[585] Thomas Huxley, *Evolution and Ethics and Other Essays* [web page] (1893 [accessed 4 March 2004]), available from http://etext.library.adelaide.edu.au/pg/etext01/thx2010.txt. Tags 79-80 (E-texts do not have physical page numbers corresponding to any one extant paper edition of a book, but are tagged with square parentheses to enable more specific referencing)

[586] Ibid.

[587] This view, Huxley thinks, was diminishing except amongst the rich, who were somewhat buffered from the trials of life (Ibid.)

[588] Ibid. Goslee also identifies this motivation (David Goslee, "Evolution, Ethics and Equivocation: T. *H.* Huxley's Conflicted Legacy," *Zygon* 39, no. 1 (2004): p. 142.)

[589] Huxley, *Evolution and Ethics and Other Essays*.

[590] Ibid. Goslee also sees contradictions in Huxley's work, especially between Huxley's main essay, and the prolegomena he later added to it. Goslee believes that these contradictions are largely the result of Huxley's attempt to respond to various critics, so that his essays preserve, not a single, pivotal argument, but, "some of the least compatible positions within the current debate." (Goslee, "Evolution, Ethics and Equivocation," pp. 138-39.)

[591] Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* [computer file] (1871 [accessed 4 March 2004]).

> "With civilised nations, as far as an advanced standard of morality, and an increased number of fairly good men [sic] are concerned, natural selection apparently effects but little; though the fundamental social instincts were originally thus gained.[592]"

Darwin, then, is apparently more optimistic than Huxley that evolution led to moral virtue, but he agrees that the "higher" levels of human ethical endeavour have little to do with evolution. He does not agree with Huxley that they necessarily run *counter* to natural selection though. Darwin separated morality into lower and higher forms because he could not conceive of a mechanism which would enable natural selection to favour those who sacrificed their lives for others, though he could see how a tribe or society which contained such individuals would prosper over its enemies.

This problem was first addressed in the theory of kin selection, which showed that the sacrificial death of an individual could still be a selective advantage if it lead to the survival of family members who contained many of the same genes. To the theory of kin selection was added the discovery of reciprocal altruism, a term coined by Robert Trivers in his classic paper of 1971[593]. Reciprocal altruism occurs when it benefits individuals to help those from whom they may reasonably expect help later. Trivers also argued that reciprocal altruism readily explained human altruistic behaviour without the need to appeal to group advantage[594]. Reciprocal altruism predates humanity by hundreds of millions of years, stretching back at least as far as the evolution of systems where small fish and even invertebrates clean larger ones[595]. Once primates, and especially humans, evolved, this same reciprocal altruism formed the biological basis for our sense of justice and fairness. So says Frans de Waal, whose opposition to Dawkins and Huxley results from his extensive work as a primatologist.

His work is detailed comprehensively in *Good Natured: The Origins of Right and Wrong in Human and Other Animals*[596]. As one example of his work, de Waal documents the conditions in which sharing has evolved in primate groups, and how this affects subsequent behaviour. He found that food is shared if it is nutritious, but prone to decay; comes in bulk quantities; is only occasionally available; and most effectively gained through collaboration[597]. Hunted game best fits this category, and he found that primates will share the proceeds of a hunt, even though they do not share fruits and other vegetable matter. In species where the meat is shared with all, even weak members will call the attention of game to the stronger. If the hunters keep the meat for themselves, those who do not expect to receive a share will not alert the group to nearby prey.

If it is true that hunting was a key factor in the development of sharing, then, as De Waal concludes, "human morality is steeped in blood.[598]" Are all other supposedly moral deeds, like sharing, really selfishness in disguise? As stated above, de Waal believes that the use of the term, "selfish" is highly problematic in discussions about the evolvability of morality. He argues that we must clearly distinguish between self-interest, which is usually unconscious, and selfishness, which is an active decision to achieve ends at the expense of others. So defined, selfishness is rare in nature, but self-interest is the very fabric of life. That is,

> "…our behaviour evolved to serve our own interests first of all. This opens the door to the possibility that our interests are best served by doing good for others.[599]"

Peter Singer agrees, arguing that sociobiology does not imply we are all selfish in any normal sense of that term[600]. Nonetheless he talks about the need to "overcome evolution" since it cannot account for

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[592] Ibid.
[593] Robert Trivers, "The Evolution of Reciprocal Altruism," *Quarterly Review of Biology* 46 (1971).
[594] Ibid: p. 48.
[595] Ibid: pp. 39-43.
[596] de Waal, *Good Natured*.
[597] Ibid, p. 144.
[598] Ibid, pp. 144-46.
[599] de Waal.
[600] Peter Singer, *The Expanding Circle* (Oxford: Clarendon Press, 1981), p. 129.

non-reciprocal altruism, even if evolution has pushed us in the direction of an expanding circle of concern towards non-rational altruism[601]. Having started out sounding very much like de Waal, in his limited acceptance of sociobiology, Singer seems to drift into the Huxleyan camp, because he has not adequately separated the Darwinian and Huxleyan world views,

> "Understanding how genes influence us makes it possible to change that influence. The basis of this challenge must be our capacity to reason… Reasoning beings are therefore in the position of the computers which in science-fiction tales rebel against their creators… Evolution works slowly, and we may well learn to control it in time to avoid disastrous errors… When we know more [about human genetics and how it affects our behaviour] we will truly be able to claim that we are no longer the slaves of our genes.[602]"

Unfortunately, this confusion means that human morality becomes a struggle against our evolutionary story, our genetic 'masters.' Our moral salvation appears when rationality evolves, which allows us to act in ways which make no evolutionary sense[603].

Flack and de Waal do not make the same mistake. They undertook a comprehensive review of primatology, which confirmed de Waal's earlier findings,

> "Many nonhuman primates… have similar methods to humans for resolving, managing, and preventing conflicts of interests within their groups… reciprocity and food sharing, reconciliation, consolation, conflict intervention, and mediation… [displaying] empathy, sympathy, and sometimes even community concern.[604]"

In other words, all of the behaviours, and emotions which we consider to be part of moral behaviour, already exist in our pre-rational primate relatives. Human rationality evolved alongside morality, it did not create it. Our morality is not a thin rational veneer struggling to contain the bloodthirsty animal within, it has an intrinsic part of us, bloodthirsty animal that we sometimes are.

Building on de Waal's work, Mary Clark, once biologist and now conflict resolution trainer, seeks to "downplay the majesty of our conscious intelligence [rationality] as the centrepiece of Who We Are.[605]" Unlike de Waal, she also downplays the importance of "bloodthirsty" hunting in the evolution of primate morality. Clark shows that the typical picture of small human bands shaped by hunting and inter-group conflict is based on very scant evidence. She claims that a more plausible story is that the human brain enlarged and evolved in an environment dominated by waves of glacial and interglacial periods, leading to frequent local extinctions. In such variable and often harsh environments, those small groups of humans who were able to communicate and cooperate, and find effective ways to limit aggression, were more likely to survive[606]. Here Clark advocates *group selection*[607], discredited in chapter 8.2.2. At the level of small human communities, however, it has more credibility, because of the relatively few generations in which selfish members within the group could outbreed others, and because Clark's definition of group selection includes many elements of reciprocal altruism and inclusive fitness.

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[601] Ibid, p. 134.
[602] Ibid, pp. 169,73.
[603] Ibid, pp. 130-33. Singer repeats this line of reasoning, and continues to use Dawkins approvingly, in his recent work on the integration of Darwinism and Left politics (Peter Singer, *A Darwinian Left: Politics, Evolution and Cooperation*, ed. Helen Cronin and Oliver Curry, *Darwinism Today* (London: Weidenfeld & Nicholson, 1999), p. 63.)
[604] Flack and de Waal, "Any Animal Whatever," p. 1. Recent brain scan studies provide additional evidence that other species may experience empathy (Christian Keysers et al., "A Touching Sight: Sii/Pv Activation During the Observation and Experience of Touch," *Neuron* 42, no. 2 (2004).)
[605] Clark, *In Search of Human Nature*, p. 57.
[606] Ibid, p. 99-124.
[607] Ibid, pp. 121-22.

Against a common assumption in sociobiology, she believes that there was little conflict between groups, due to their sparse distribution, so the idea that violent tribes displaced others is unfounded. By contrast, groups which promoted violence were less likely to persist, since they would not be able to cooperate well together[608]. For relatively small groups in the Pleistocene, as for some primate groups in the wild today, explosions of violence were easily avoided in times of intra-group conflict either by sending individuals to other groups, or fissioning the group into two[609]. Clark is not rejecting the possibility of human violence, indeed she documents it at length. She disagrees, however, that violence is inevitable or a core part of our nature. Instead, it is a behaviour which emerges in response to highly stressful situations[610]. What these situations have in common is that they lead to a breakdown in the ability of humans (and other primates) to fulfil their true basic drives.

The first drive is for bondedness, or relationships, which begins at birth with our absolute dependence on bondedness to another (mother, then father, then the whole group) for survival. In tension with this is the innate drive for autonomy, by which Clark means not independence as much as having one's own identifiable place *within the community*, being able to contribute to the life of the community freely and creatively. To alleviate the conflicts these desires create within the individual and amongst group members, our expanding brain and developing language helped create increasingly complex meaning systems (culture)[611]. The drives for bondedness and autonomy are shared by primates[612], whilst the desire for meaning appears to be a human phenomenon, though perhaps chimps prefigure it[613].

Clark argues persuasively that sociobiologists focus on violence and sexual drives as core constituents of humanity because they have predominantly grown up in western industrial, hierarchical cultures which are dysfunctional. They then usually study other people who live in western, industrial hierarchical cultures as if they were the norm of humanity, rather than an extremely recent aberration[614].

A recent addition to the largely chimp based evidence for this line of thinking comes from a report of a study of a group of baboons, which almost always exist in violently maintained hierarchies. Through a curious anomaly, the dominant half of the males of a free ranging population were killed by a disease, leaving only the less aggressive, subordinate males. This lead to a marked reduction of violence within the troop, as expected. Unexpectedly, however, this more peaceful situation persisted for many years, long after the initial males were dead and the troop was full of new immigrant males (all juvenile males leave their troop of origin and join another). In other words, a *culture* of peace was maintained and preserved since that original anomaly[615].

Clark also criticises the apparent obsession of some sociobiologists and evolutionary psychologists with uncovering the biological basis of different behaviour between the sexes in humans. As we have already seen, she points out that biological dimorphism in humans is markedly less than in most other primates, and that the actual emotional and behavioural responses of males and females are much more

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[608] Ibid, p. 123.
[609] Ibid, p. 125. Clark argues that primate violence in zoos is often due to the inability to form separate groups or exile individuals. She documents the same phenomenon even in the wild, since many chimpanzees are now confined to tiny remnants of forest (Clark, *In Search of Human Nature*, p. 123.)
[610] Clark, *In Search of Human Nature*, p. 62, 106, 23, 222, 41, 46-49.
[611] Ibid, p. 58. This triad is introduced here, but forms the core argument of the entire book.
[612] Ibid. Personally, I would expect the drive for bondedness to exist in any organism which relies on parental care, and the drive for autonomy to exist at the very least in social mammals.
[613] Ibid.
[614] Ibid, pp. 238, 59-62.. This claim is revisited throughout the second half of the book.
[615] Robert M. Sapolsky and Lisa J. Share, "A Pacific Culture among Wild Baboons: Its Emergence and Transmission," *PLoS Biology (Public Library of Science Biology)* 2, no. 4 (2004).

similar than they are different[616]. She adds that what differences we do see are largely culturally conditioned[617].

In short, human nature is found in the balancing of bondedness and autonomy, and the meaning systems we create to enable this. We are neither intrinsically hierarchical nor egalitarian (though for most of our evolution we operated predominantly in the latter mode). Our relationships do not primarily derive from conflicting sexual reproduction strategies, but as extensions of our parenting behaviours which, for most of our history, males and females shared pretty equally, and in which all members of successful groups participated. The violence we often witness today is not something intrinsic to our nature, but a result of the disparity between the environments most of us now live in and those of our Pleistocene ancestors, with whom we are still almost genetically identical.

So, we have been birthed by a web of self-interest (not conscious selfishness), and we continue to live within it. Our genes do not directly program our behaviour[618], but provide us a complex network of behavioural decisions with which to respond to our environment[619]. This behavioural network expresses itself amongst primates in everything from selfishness and murder to love and sympathy[620]. So we *are* able to engage in unselfish acts. They are not an illusion, but they are, in some way, derived from our history of self-interest. Our genes' "self interest" is always to replicate, and they are totally amoral in how they achieve this. At the other end of the cerebral scale, humans are interested in much more than reproduction. We want to feel bonded to others in our community, and to preserve our autonomy within it. We want the balancing of those desires to make sense, to give meaning. We are interested in being successful not only reproductively, but psychologically. This need for meaning exploded with the explosion in size of our brains in the Pleistocene. At least some evolutionary psychologists claim that if we are to retain a sense of meaning, of psychological health, then we need to retain contact with the diverse web of biological interactions in which our brains evolved.

8.2.6 Biophilia - life as Other

We evolved in a web which we found both beautiful and delightful, and ugly and terrifying. Our psychology, our behavioural network, was formed in this web, and therefore perhaps *requires* this web to keep functioning properly. Edward O. Wilson coined the term *biophilia* in 1984, and in 1993 he defined it thus,

> "Biophilia… is the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and thus part of ultimate human nature… Biophilia is not a single instinct but a complex of learning rules that can be teased apart and analysed individually… from attraction to aversion, from awe to indifference, from peacefulness to fear-driven anxiety.[621]"

I will follow Wilson in including within bio*phila* feelings like aversion and anxiety, though others call these responses bio*phobias*[622]. Biophilia is a complex, variable, emotional attachment to life. It is such a complex system because we have evolved in such a complex eco-system, and have such a complex brain to process it. The implication of the biophilia hypothesis is that our psychological health depends on the complexity of our immediate ecosystems, and the depth of our interaction within it. Our ecosystems have been diminished in various ways. We have already considered the net

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[616] Clark, *In Search of Human Nature*, pp. 239-40.
[617] Ibid, p. 239.
[618] Even Dawkins is adamantly not a genetic determinist when it comes to behaviour (Dawkins, *The Selfish Gene*, p. 3. Especially Dawkins, *The Extended Phenotype*, pp. 11-29.
[619] de Waal, *Good Natured*, p. 18.
[620] Ibid, p. 16.
[621] Edward O Wilson, "Biophilia and the Conservation Ethic," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993), p. 31.
[622] For example, Sagan & Margulis prefer the term prototaxis, the tendency for all organisms to react in distinctive ways to other organisms, which would include biophilia and biophobia (Sagan and Margulis, "God, Gaia and Biophilia," p. 346.) Since all other contributors to *The Biophilia Hypothesis* follow Wilson's broader definition, I will do so also.

reduction in global biodiversity, which results in local extinctions. It follows that, for humans in a specific area, local extinctions of animals cause an, "extirpation of experience[623]," making the world a, "poorer, darker, lonelier place.[624]"

This has been exacerbated by the developments of agriculture and domestication, so that most humans now surround themselves with domestic animals rather than wild ones[625]. Associated with this trend has been a shift in human representations of the image(s) of God(s). Amongst nomadic hunter gatherers the spirits or gods were represented by wild animals[626]. As agriculture developed around the Mediterranean coast, with its seasonal approach to 'nature', the representation of the gods shifted towards human women, with their regular menstrual cycle[627]. Other groups of humans, who lived in the low fertility interior, survived by herding game over large distances. This separated the men from the women and children, and exposed the men to constant danger, especially to the tempestuous elements. Their image of God evolved into the male God of the storms and skies, and became associated with strong sex based differentiation of labour, itself leading to various gendered hierarchies. When global climate changed and the inland became even more arid, these shepherds increasingly raided the coastal agricultural lands for survival. Over several centuries they gained control and influence over coastal areas, and their male sky gods replaced the female gods of the seasons. The importation of the patriarchal social structure, and increasing technological developments like irrigation, presumably aided the adoption of the male God as supreme. Figure 5 illustrates this evolution of the image of God.

[623] Gary P Nabhan and Sara St. Antoine, "The Loss of Floral and Faunal Story: The Extinction of Experience," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993).
[624] Douglas Adams and Mark Carwadine, *Last Chance to See* (Ballantine, 1992), backmatter. I read this book years ago and could not find a copy again, I found the quote on the Amazon.com book search, which refers to the end of book as "backmatter" rather than by page number.
[625] Paul Shepard, "On Animal Friends," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993).
[626] Ibid, p. 292.
[627] The rest of this paragraph is based on a detailed reconstruction of human cultural history by Clark, *In Search of Human Nature*, pp. 263-95. Clark's work is itself a summary of the comprehensive investigation of changing images of the goddess in Anne Baring and Jules Cashford, *The Myth of the Goddess: Evolution of an Image* (London: Penguin, 1993).

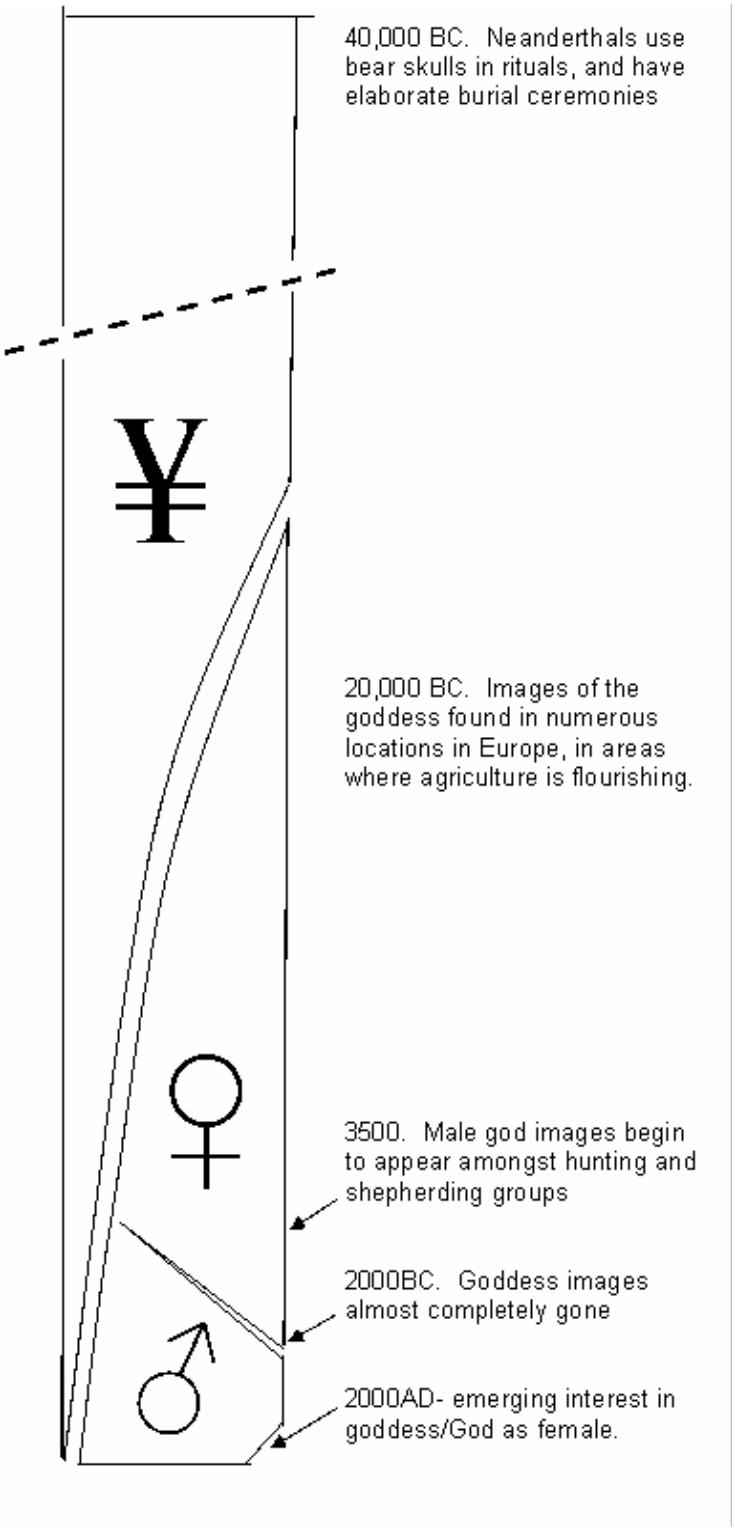

Figure 5. The evolution of the image(s) of God, based on the text in Baring and Cashford, The Myth of the Goddess: Evolution of an Image

Many westerners now have no direct contact with livestock at all. If anything, we have pets. Paul Shepard summarises the argument that our pets are enslaved phenotypic freaks[628]. The pet industry

[628] Shepard, "On Animal Friends," p. 286. When I worked briefly for a vet he lamented the constant health problems faced by pedigree dogs and cats, and pointed out that Chiuwawas are foetuses with a genetic mutation which prevents them

marks the end of our respect for the Wild Other. They, along with livestock, become the lens through which we now see wild nature, and the expectations we impose upon it. This leads not only to the diminution of the wild Other, but of ourselves, who evolved in conjunction with Otherness for so long,

> "The substitution of a limited number of genetically deformed and phenotypically confusing species for the wild fauna may, through impaired perception, degrade the human capacity for self-knowledge. The loss of metaphorical distance between ourselves and wild animals and the incorporation of domestic animals as slaves in human society alter ourselves and our cosmos.[629]"

Madhav Gadgil speculates that what underlies our apparent biophilia is actually a fascination with manipulating and understanding *things*, which lead to domestication of crops and animals in the first place[630]. For example, he found that the love and fascination for Indian wildlife that he passed on to his son was quickly replaced by a love and fasciation for computers when they purchased one for the home. He points out that our evolutionary development occurred not only in the context of a diverse ecosystem, but was a story where those who had a fascination for artefacts, and learned to shape and use them (i.e. the technophilic), gained rapid advantage over others[631]. We might conclude from this that humans only need something to be fascinated by, not necessarily animals, for a healthy psychology, but this is of course highly speculative.

Wilson, for one, is sceptical. He points out that we have spent more than 99 percent of human history as hunter gatherers. Our brains evolved in a biocentric, not machine regulated world[632]. As a consequence,

> "… when human beings remove themselves from the natural environment, the biophilic learning rules are not replaced by modern versions equally well adapted to artefacts… they persist from generation to generation, atrophied and fitfully manifested in the artificial new environments into which technology has catapulted humanity.[633]"

Yet at least some humans *are* technophilic, or else I would be handwriting this thesis, or reciting it verbally. Our technophilia has opened up a new world of perception, which emphasises our unity with, rather than difference from, the "Other". Our microscopes and computers reveal to us the existence of the genes which are the foundation of our bodies, and even many of the mechanisms by which they work. It provides an extraordinarily powerful tool with which to investigate the relationships between species on Earth, and adds weight to Darwin's shocking claim that humans are, fundamentally, animals.

8.2.7 Genetics: life as One

8.2.7.1 The human *animal*

Homo sapiens is genetically more similar to *H. neanderthalensis* than two subpopulations of modern chimpanzees are to each other, and only slightly less close to *H. erectus*. We were similar enough, genetically, to breed successfully with Neanderthals[634]. Yet we lump all chimpanzees into one species,

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maturing, hence the short muzzles, deformed legs and googly eyes. Incidentally, more people are bitten badly enough to require medical attention by Chiuwawas than any other kind of dog.

[629] Ibid, p. 298.

[630] Madhav Gadgil, "Of Life and Artifacts," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993), p. 366.

[631] Ibid, p. 370.

[632] Wilson, "Biophilia and the Conservation Ethic," p. 32.

[633] Ibid, pp. 31-32.

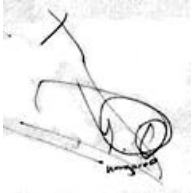
[634] Southwood, *The Story of Life*, p. 231.

and separate the various *Homo* remnants we discover into separate species. Several scientists argue that we should overcome this inconsistency by expanding our definition of the human to include not just ourselves, but our Neanderthal and *Erectus* cousins, as well as *Floresiensis*. Zimmer pushes us to expand the boundary around "human" even further. The first human beings, he argues, were *H. ergaster*, who appear in the fossil record 1.7 million years ago[635]. If the following artists' reconstructions are in any way accurate (figure 6 and figure 7)[636], it seems fair to say that, were *H. ergaster* found alive today, they would certainly be considered human[637], racism notwithstanding[638]. Humanity, then, is a less clear category than many people assume it to be.

[635] Zimmer, *Evolution*, p. 267.

[636] Figure 1 is a composite from Tattersall, "Once We Were Not Alone," pp 23-25. Figure 2 is from Zimmer, *Evolution*, p. 267.

[637] One commentator has classified *H. ergaster* as monkeys (Finn Jerome Lawson-John, Personal Communication, November 2003.). However, I consider his analysis dubious, since he also identified a photo of ageing male orang-utan as his grandfather, and his own artistic reconstructions of primates leave something to be desired. His marsupials are quite



good, however,

[638] Australian history teaches us that humans readily deny the humanity of others who look only slightly different. When I visited Uganda in 1998 a number of locals either doubted or outright rejected the humanity of pygmies.

Figure 6. *Homo ergaster*, *neanderthalensis* and *erectus*

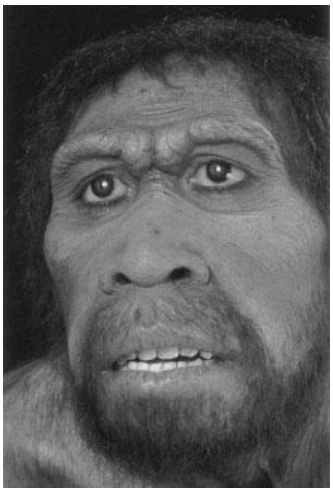


Figure 7. *Homo ergaster*, from Zimmer, which he calls the earliest species to warrant the term human.

Chimpanzees themselves are so genetically similar to us, with almost 99 percent of our gene sequences identical[639], that there has been a strong push to reclassify them as part of the genus *Homo*[640]. Indeed, chimps are more closely related to us than they are to any other primate[641], to the extent that it is possible that human/chimp offspring would survive[642], but probably be sterile. I follow Zimmer, and draw the boundary around humanity somewhere between *H. ergaster* and chimpanzees, though Bernard Michollet claims that it should be stretched far enough to include Australopithecus[643].

Humans do have properties which no other animals do, and *H. sapiens* have properties which differ from other humans. It is, however, universally accepted amongst evolutionists that *H. sapiens* differs from other species by *degree*, rather than possessing any ontological difference. As far as we know, one aspect of our biology is more developed than that of any other creature- our cerebral cortex, and the abilities that gives us. As Mayr says,

> "Man [sic] is indeed as unique, as different from all the other animals, as had been traditionally claimed by theologians and philosophers.[644]"

However, although we are more intelligent than most other animals by, "orders of magnitude,[645]" many other animals are not only intelligent, but display emotions such as fear, happiness and depression. Clearly, these things did not suddenly arrive with *H. sapiens*[646]. Frans de Waal agrees, based on extensive study of primates and other mammals,

> "As a separate species, humans do possess distinct traits, yet the overwhelming majority of our anatomical, physiological, and psychological characteristics are part of an ancient heritage.[647]"

> "Morality is as firmly grounded in neurobiology as anything else we do or are. Once though of as purely spiritual matters, honesty, guilt, and the weighing of ethical dilemmas are traceable to specific areas of the brain. It should not surprise us, then, to find animal parallels. The human brain is the product of evolution… it is fundamentally similar to the central nervous system of other mammals.[648]"

The expression of culture, long thought to be a distinctively human trait, is almost unanimously identified by primatologists amongst their study subjects. At its most basic, culture (or proto-culture) is defined as,

> "… behaviours shared by a population, but not necessarily other species members, that are independent of genetics or ecological factors and that persist past their originators[649]."

According to this definition, culture has even been reported amongst cetaceans (dolphins and whales), and even some birds and fish[650]. Accompanying this spectrum of expression of culture is a spectrum

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[639] AG Clark et al., "Inferring Nonneutral Evolution from Human-Chimp-Mouse Orthologous Gene Trios," *Science* 302, no. 5652 (2003).
[640] Nick Campbell, "What It Takes to Be a (Hu)Man," *Nature Reviews Genetics* 5, no. 3 (2004).
[641] Mayr, *What Evolution Is*, p. 259.
[642] Nick Campbell, email, 17 Feb 2004.;Potts and Short, *Ever since Adam and Eve*, p. 22.
[643] Bernard Michollet, "Evolution and Anthropology: Human Beings as the 'Image of God'," in *Evolution and Faith*, ed. Bas van Iersel, Christoph Theobald, and Hermann Häring, *Concilium* (London: SCM, 2000), p. 81.
[644] Mayr, *What Evolution Is*, p. 279.
[645] Ibid, p. 280.
[646] Ibid, p. 283.
[647] de Waal, *Good Natured*, p. 65.
[648] Ibid, pp. 216-17. Other examples of the continuity between *H. sapiens* and other animals will come to light in subsequent parts of this chapter.
[649] Sapolsky and Share, "A Pacific Culture among Wild Baboons: Its Emergence and Transmission," p. 1.

of consciousness, though it is difficult to say exactly how to measure the latter[651]. Recent evidence suggests that some dolphin species exhibit some level of *self*-consciousness[652], as may chimpanzees[653]. It is even more likely that the now extinct *Homo* and *Australopithecine* species did so, since they are even more closely related to us.

In summary, limiting "human" to *H. sapiens* is a construct, and should be extended at least to encompass other species of *Homo*. The sharp boundary which we drew around humans on the basis of intellect or culture or self awareness is also a construction, an artificial imposition onto a continuum of each of these things which extends from microbes to ourselves. The sciences encourages us to continue this line of inquiry to the point where we question whether there is any such thing as a species in the first place, or whether this itself is yet another artificial construction imposed on a continuum.

8.2.7.2 The species construct

Margulis and Sagan recognise the obvious point that we all *do* have a strong sense of species[654], though it is more accurate to say that we all have a strong sense of *relevant species*. Of the thousands of species that an organism encounters, it notices and learn to distinguish between those that are important to it. People who rely on frogs and mushrooms for food, for example, are highly likely to be aware of the subtle clues that distinguish poisonous from edible ones. Jared Diamond provides extensive evidence of this phenomenon amongst hills tribes in New Guinea[655]. Gary Nabhan and Sara St. Antoine document how quickly such abilities are lost when people are removed from ancestral lands to reservations[656].

Diamond demonstrates that the supposedly human-wide phobia of snakes, attested to in Genesis 3:15, is nothing of the sort. Those communities which still eat snakes have no fear of the non-venomous varieties which constitute a meal. It is only in societies where snakes are no longer eaten, and where it is thus more sensible to simply teach children to be afraid of all of them, that snake phobias exist[657]. I have discovered personally that the same variations exist amongst families. Our house in suburban Oxley backs onto an extensive wetland. Five species of snakes enter our property at different times of year. One of the snakes is potentially deadly, and another quite venomous. The other three are non-venomous and feed on the vermin which attack our crops and chicken eggs. We therefore became very good at identifying snakes and responding accordingly. Our xenophobic neighbour has the same five species of snake. Since she has no crops or chickens, she perceives no benefit in having pythons and trees snakes in her yard. From her screams it is clear that she identifies all snakes (and even large lizards) as "danger."[658]

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[650] Kevin Laland and William Hoppitt, "Do Animals Have Culture?," *Evolutionary Anthropology* 12 (2003), Michael J Noad et al., "Cultural Revolution in Whale Songs," *Nature* 408, no. 6812 (2000), Sapolsky and Share, "A Pacific Culture among Wild Baboons: Its Emergence and Transmission."

[651] Marc Bekoff, "Consciousness and Self in Animals: Some Reflections," *Zygon* 38, no. 2 (2003), Thomas Nagel, *What Is It Like to Be a Bat?* [internet] (1974 [accessed 7 October 2004]), available from http://members.aol.com/NeoNoetics/Nagel_Bat.html, Gregory Peterson, "The Evolution of Consciousness and the Theology of Nature," *Zygon* 34, no. 2 (1999): p. 287-89

[652] Julian Paul Keenan and Mark Wheeler, "Elucidation of the Brain Correlates of Cognitive Empathy and Self-Awareness," *Behavioural and Brain Sciences* 25 (2002): p. 40.

[653] Boysen and Himes offer a recent survey of the uncertainties of the field (S Boysen and G Himes, "Current Issues and Emerging Theories in Animal Cognition," *Annual Review of Psychology* 50 (1999).) Some theologians readily accept the possibility (Barbour, *Nature, Human Nature, and God*, p. 44, Nancy Howell, "A God Adequate for Primate Culture," *Journal of Religion and Society* 3 (2001), Korsmeyer, *Evolution and Eden*, p. 81.) Howell goes into this in the most depth.

[654] Margulis and Sagan, *Acquiring Genomes*, p. 5.

[655] Jared M Diamond, "New Guineans and Their Natural World," in *The Biophilia Hypothesis*, ed. Stephen R Kellert and Edward O Wilson (Washington, D.C.: Island Press, 1993), pp. 255-66.

[656] Nabhan and St. Antoine, "The Extinction of Experience," p. 241.

[657] Diamond, "New Guineans and Their Natural World," pp. 265-66.

[658] Of course this also reflects our upbringing, but even if I was afraid of snakes as a child, if my life changed so that I needed to be able to distinguish them, I could easily do so.

One objection might be raised, that plenty of people are able to identify animals that have no relation to their ability to survive, for example bird and butterfly enthusiasts. This appears to be a modern phenomenon, however, perhaps a side effect of our expanded leisure time which makes it possible to decide to memorise things just for fun, whether birds or trains[659]. Diamond demonstrates that although tribes in New Guinea can identify almost every species of plant and animal on which they depend for survival, they do not distinguish species of butterfly, nor do they have any system of constellations for stars, since they are useless for navigation in jungles[660].

Margulis and Sagan explain the evolution of the ability and tendency to categorise thus,

> "…our ancestors needed it to recognise food, potential mates… and many other organisms *in order to survive*… An instinctive evolutionary cognition of life forms has been crucial to our and other species' survival (emphasis mine).[661]"

But the ability to distinguish species is readily observed in other animals. Gould accepts that,

> "… our brain's preference for dichotomisation arose as a highly adaptive attribute in a very distant and ancient small-brained ancestor… dichotomisation then persisted throughout the subsequent phylogeny of vertebrates as a historical constraint that became more and more quirky, and more and more limiting, as the brain enlarged into the much more sophisticated instrument of a lineage that eventually generated our exalted, but curiously freighted, selves.[662]"

But he surely puts the development of dichotomisation far too recently in the history of life. Even very simple organisms are able to distinguish light from dark, and warm from cool. Categorisation is fundamental to the very survival of biological life.

When microbes were the only life on the planet, there was no such thing as a species, since they all exchanged DNA with each other[663]. As the gene assemblages of eukaryotic cells become more finely tuned they are less able to integrate new genes, which increases their reproductive isolation. As the phenotypes of these cells diverged, we began to see different "streams" of the evolution of different strategies. Those genes which continued to contribute to successful extended phenotypes continued to be passed from generation to generation, often with other complementary genes. That is the process that continues today; a delta like "river" of genes flowing from the beginning of life. This metaphor is adopted by Dawkins, and by Zimmer, in conjunction with the history of mass extinctions,

> "The river of my title is a river of DNA, and it flows through time, not space. It is a river of information, not a river of bones and tissues: a river of abstract instructions for building bodies, not a river of solid bodies themselves. The information passes through bodies and affects them, but it is not affected by them on its way through.[664]"

> "It is an ancient world, in which we are an infant species; a broad river of genes flows around us and through us, its course altered by asteroids and glaciers, by rising mountains and spreading seas.[665]"

The idea of the continuity, even fluidity amongst species is an old one. Long before the genetic relatedness of all organisms was known, or even Darwin's *Origin* published, Etienne Saint-Hillaire

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[659] It could also be that these tendencies are another form of peacock feather- a subconscious desire to demonstrate competence in something to impress members of the opposite sex. Or they could be a maladaptation, since those obsessed with train identification tend not to generally impress. I am unaware of any studies of their breeding success.
[660] Diamond, "New Guineans and Their Natural World," pp. 261-62.
[661] Margulis and Sagan, *Acquiring Genomes*, p. 5.
[662] Gould, *The Structure of Evolutionary Theory*, p. 1266.
[663] Margulis and Sagan, *Acquiring Genomes*, p. 55.
[664] Dawkins, *River out of Eden*, p. 4.
[665] Zimmer, *Evolution*, p. 344.

argued that all animals, vertebrate and invertebrate, came from the one form, so that, "There is, philosophically speaking, only a single animal.[666]"

Mayr, by contrast, argues that a species *is* a real entity,

> "In order to refute erroneous opinions of some philosophers, it must be emphasised that the species is not an invention of taxonomists or philosophers, but that it has a reality in nature. *The existence of species is known to the most primitive human tribes*...Although a few nominalists still survive, it is now almost unanimously agreed that there are real discontinuities in nature (emphasis mine).[667]"

When examined closely, however, it is clear that his argument is only that species are a real discontinuity from the point of view of humans and other animals, which are, after all, the focus of his work. Consider a river which branches into a delta. Each tributary is in a sense discontinuous from the others, yet when viewed from above all seen to be part of the same source, and may well merge further downstream, as did the various microbial DNA assemblages that merged to form the eukaryote. Somebody travelling the river may well depend on the ability to distinguish between tributaries in order to survive, someone flying overhead could simply take in the whole scene and wonder at it.

Dawkins encourages us to look at the river not so much from above as from within. He argues that the breakdown in the concept of species needs to be accompanied by a breakdown in the concept even of the individual body. Despite all appearances to the contrary, bodies are not fundamentally discrete entities at all[668]. This is his *extended phenotype* world view, in which genes affect not only the bodies in which they reside, but extend their influence out into the world around them.

8.2.7.3 The extended phenotype

As we have already seen, Dawkins argued that genes are the basic unit of selection[669]. Mayr seemed to agree, but argued that the phenotype of the organism in which the genes reside is the basic *agent* of selection, i.e. that which natural selection acts upon. Dawkins' extension of Mayr's view is that the phenotype of a gene is not limited to the organism in which it resides. Dawkins wrote *The Extended Phenotype* for his professional colleagues, hoping to,

> "…free the gene from the individual organism which has been its conceptual prison. The phenotypic effects of a gene are the tools by which it levers itself into the next generation, and these tools may 'extend' far outside the body in which the gene sits, even reaching deep into the nervous systems of other organisms.[670]"

> "Fundamentally, what is going on is that replicating molecules ensure their survival by means of phenotypic effects on the world. It is only incidentally true that those phenotypic effects happen to be packaged up into units called individual organisms.[671]"

He restates the second paragraph in a later, more popular work,

> "The individual organism… is not fundamental to life, but something that emerges when genes, which at the beginning of evolution were separate, warring entities, gang together in cooperative groups, as 'selfish cooperators'. The individual

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[666] This was in 1830. Cited in Zimmer, Ibid, p. 29.
[667] Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist*, pp. 315-17.
[668] Dawkins, *The Selfish Gene*, p. 11. Also Dawkins, *Unweaving the Rainbow*, p. 216.
[669] I have already explained what Dawkins means by genes. It must also be remembered that genes are not so much pieces of chromosomes, as *alternative* versions of the same locus on a chromosome. So, in humans three of our genes which relate to blood are labelled A, B, and O. These genes are, for Dawkins, in competition with each other for the same allele, and their survival into the next generation is the fundamental selection event.
[670] Dawkins, *The Extended Phenotype*, p. vi.
[671] Ibid, p. 5.

> organism is… a secondary, derived phenomenon, cobbled together as a consequence of the actions of fundamentally separate, even warring, agents.[672]"

Dawkins is not introducing a new set of facts into the study of evolution, but rather a different way of seeing facts. He believes that this new way of thinking helps make better sense of many observed phenomena in the world, where individual organisms act in ways which do not appear to be for their own benefit. This, he believes, is because the organism is under the influence of the genes of *other* organisms, which are manipulating it to their advantage.

One of Dawkins' examples is the cuckoo, which lays its eggs in the nests of other species of birds, who then feed the cuckoo chicks[673]. There are genes assemblages in cuckoos which make their eggs closely resemble those of other species, and which make females cuckoos lay their eggs in those nests. This is a simple phenotype. Other genes in cuckoos, however, cause baby cuckoos to look and behave in such a way that they manipulate their unwitting foster parents to feed them, even at the expense of raising their own offspring. The behaviour of the foster parents is the extended phenotype of the genes in the cuckoo, and is the result of the indirect manipulation of the host's nervous system. Dawkins believes that the manipulation of nervous systems through visual displays, sounds, and pheromones is probably far less difficult and dangerous than attempting to physically manipulate other organisms. It is hard to see, for example, how a cuckoo could force other birds to do its child rearing using physical coercion. Insects, however, or rather their genes, excel at the direct manipulation of other organisms because they are small enough to get inside them. We have entered the world of the parasite.

Dawkins lists some of the hundreds of known case studies of parasites and their influence on both the physiology and behaviour of their hosts. He then argues that a cuckoo's genes are just as parasitic as those of a liver fluke. This leads to his central theorem, that

> "An animal's behaviour tends to maximise the survival of genes 'for' that behaviour, whether or not those genes happen to be in the body of the particular animal performing it (emphasis his).[674]"

This leads to a conceptual web of relationships amongst genes. Some are very intimate relationships, such as two genes on the same chromosome. Other strands stretch much further, across individuals, species, even kingdoms,

> "The whole biosphere… is criss-crossed with an intricate network of fields of genetic influence, a web of phenotypic power." We stand, "in the midst of uncountable interlocking fields of replicator power.[675]"

This is where Dawkins' work extends that of Margulis and Sagan. Although they remain focused on bodies, they make it clear that what we think of as *individual* organisms are actually assemblages of numerous organisms, a loose community[676]. I have already used their examples of cows and humans as community assemblages of life forms. They use the words of Clair Fulsome to express their general point, that if somehow all of your human cells could be magically vaporised,

> What would remain would be a ghostly image, the skin outlined by a shimmer of bacteria, fungi, round worms, pin worms, and various other microbial inhabitants. The gut would appear as a densely packed tube of anaerobic and aerobic bacteria,

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[672] Dawkins, *Unweaving the Rainbow*, p. 308.
[673] Dawkins, *The Extended Phenotype*, pp. 67-70. Also Dawkins, *Universal Parasitism,* Dawkins, *Unweaving the Rainbow*, pp. 246-52.
[674] Dawkins, *The Extended Phenotype*, p. 233.
[675] Ibid, p. 238.
[676] Margulis and Sagan, *Acquiring Genomes*, p. 19.

> yeasts, and other microorganisms… viruses of hundreds of kinds would be visible throughout all tissues. We are… a seething zoo of microbes.[677]"

Dawkins' point is that we can conceive of a human not simply as an assemblage of organisms, but of overlapping phenotypes which combine to influence our biochemistry and behaviour in a, "web of phenotypic power." Dawkins is at pains to distance his metaphor of the web from the sort of benign, cooperative system often presented in ecology texts, the sort relied on in the Uniting Church resources,

> "A network of relationships there may be, but it is made up of small, *self-interested* components. Entities that pay the costs of furthering the well being of the ecosystem as a whole will tend to reproduce themselves less successfully than rivals that exploit their public-spirited colleagues, and contribute nothing to the general welfare (emphasis his). [678]"

Genes do still "cooperate" with each other as a byproduct of their own survival. Genes with complimentary effects will tend to prosper in each other's presence. In other words, the extended phenotype is a blend of the phenotypes expressed by all the genes involved, whether in the same genome, or even same cell, or not. So, genes will often cooperate, but only for their own self interest (to be replicated). The more similar the means of replication of genes at different alleles, the more they are likely to evolve to complement each other. So genes in our nucleus are likely to be very mutually beneficial. This adds another element to the evolution of sex. Sexual reproduction, with its random shuffling of chromosomes, ensures that all genes have an equal chance to end up in the gametes, and thus guard against those genes which might somehow evolve to increase their odds of reproduction at the expense of others in the genome[679].

Where the genes have contradictory means of replication, say a cuckoo's genes *versus* its host's genes, or viral genes that are injected into our cells, they will evolve in competition with the rest of the host's genes. The more their extended phenotypes overlap, the sharper the competition will be.

So, gene assemblages have come together to create phenotypes which aid their replication in competition with the phenotypes of other gene assemblages. These phenotypes include the body, or vehicle, in which they are replicated, but extend beyond it, as if individual bodies were somehow translucent, fuzzy and overlapping, yet able to interact with each other.

When we add the dimension of time we see that, again from the gene's perspective, the offspring are largely a continuation of the parent, a continuation of their genes into the future. In asexual reproduction they are *literally* a continuation of the parent. Long before the genetic basis of heritability was understood, Charles Darwin's grandfather, Erasmus Darwin, argued that,

> "Owing to the imperfection of language, the offspring is termed a new animal; but is, in truth, a branch or elongation of the parent, since a part of the embryonic animal is or was a part of the parent, and, therefore, in strict language, cannot be said to be entirely new at the time of its production, and, therefore, it may retain some of the habits of the parent system.[680]"

So the boundaries which we have drawn around humans, around other species, and even around bodies are more fuzzy and fluid than we imagine. The constantly evolving life around and within us looks different depending on where you view it from. If there was a Being able to watch the entire history of life on Earth, and whose survival did not depend on the ability to discriminate amongst species, they may see life very differently than we do. How might such a Being, unlimited by our constraints, see

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[677] Clair Fulsome, "Microbes," in *The Biosphere Catalogue*, ed. Tango Parish Snyder (Oracle: Synergetic Press, 1985). Cited, without page reference, in Margulis and Sagan, *What Is Life?* , p. 178.
[678] Dawkins, *The Extended Phenotype*, p. 236.
[679] Dawkins considers this topic, and the possibility of genes circumventing it in considerable detail (Ibid, pp. 133-54).
[680] From *Zoonomia*, Cited in Margulis and Sagan (Margulis and Sagan, *What Is Life?* , p. 176.)

life on Earth? As we explore this question, it will be helpful to create an image of life, however approximate, which tries to bring together the insights from the science story sketched above. We can hold this in our mind as we do our theology. Part of the reason for the persistence of a Genesis inspired view of life is surely the wealth of beautiful iconography which supports it, so we need something equally beautiful with which to break it down.

8.2.8 The image of life - Other and One

Gould argues that complex thoughts are best portrayed as images to primates[681], which led him to his image of the Darwinian stool. Dawkins wrote *Unweaving the Rainbow* to try to unearth good scientific poetry, which could convey complex ideas to a broad audience, and laments that there is not more of it. Most of Dawkins' examples of bad poetry come from Gould[682], whilst Gould thinks that the key image of Dawkins' *Climbing Mount Improbable* is ill-chosen and erroneous[683]. I therefore believe it both important to find an illustration of the phenomenon of life which will convey its main features, and to recognise that no image will please everybody. Indeed, it is a tall order. The image will need to convey many things; the genetic continuity of all life; the splitting of life forms into different species; the principle of symbiogenesis; the existence of mass extinction events; the time scale; and the place of humans in the story of life. Approaches to illustrating "life" seem to fall into two main categories. The first is to draw the, "web of life," showing the ecological relationships between a number of species. The second is to draw the, "tree of life," which shows the historical relationships between evolving species. I will consider the usefulness of each in turn.

The web of life is, as I have said, a ubiquitous metaphor in ecology, both in academic text books and popular media. Often represented literally as a spider's web, it is occasionally rendered in more detail, of which figure 8 is a typical example,

[681] Gould, *The Structure of Evolutionary Theory*, p. 15.
[682] Dawkins, *Unweaving the Rainbow*, p. 193.
[683] Gould, *Self-Help for a Hedgehog Stuck on a Molehill*.

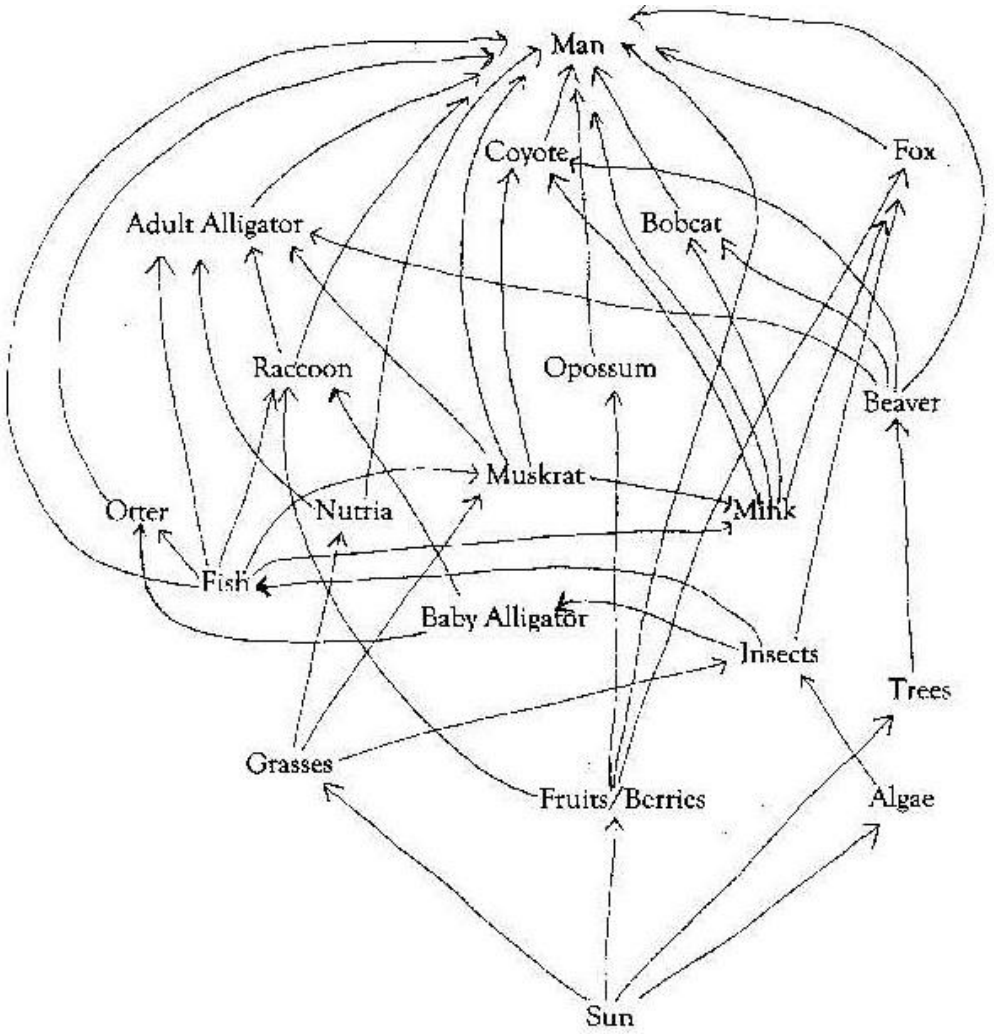

Figure 8. Sketch of the web of interactions of an ecosystem, from an American education web site (http://www.alligatorfur.com/education/web2.jpg), author unknown. The arrows show the flow of a resource from one element to the other. So humans hunt alligators, which eat raccoons, which eat berries, which need sunlight to grow.

There are two problems with these images. Firstly, they are so simple. They imply that each species is more or less a single unit, which interacts with other units. In reality, every individual creature on Earth is linked directly to hundreds or millions of others[684]. Dawkins encourages us to see, superimposed on that web, the billions of billions of links representing the interactions of genes with each other, as our extended phenotypes interact with those of other organisms. This is nearly beyond the imagination, but there it will have to remain as it will never be drawn[685]!

Even this image of a web with billions of interconnections is impoverished and inadequate. It ignores the evolutionary history of life. Life is not a static web, but rather a cross section of an enormously complex flow of life at the particular point in time in which we live. This web changes second to second, as every creature is born and dies. Its dynamism staggers the imagination. Not only that, but since the actions of organisms in the past affect us, and we will affect the future, then the strands of the web, the relationships they signify, also move through this third dimension.

Perhaps we could rescue the web of life as a useful image if we think carefully about which web we mean. We could emphasise spiders, who respin their webs every night. This at least would convey the dynamic nature of the web, though there is no obvious sense of connection between the patterns on subsequent recreations. Further, such webs are usually fairly simple, two dimensional ones.

We might think instead of the web of a golden orb spider like those in Brisbane. Their massive, messy conical tangles haunt disused paths. After the path is cleared with a stick (our mass extinction event), the web flourishes again with a recognizable pattern, yet unpredictable in its details. In the botanical gardens in Entebbe, Uganda, some paths are now impenetrable because of the massive tangle of orb spider webs. If I could find the photo I took of it you would now be looking at the best picture of life I have ever seen.

But few people *do* think of such webs. Even if they did, all webs are created by the direct action of an external agent, they are not at all self creating, but rather designed, even if only by genetically programmed instinct. Design and external manipulation are, as we have seen, rejected by evolutionists, even though the Uniting Church resources, both anthropocentric and biocentric, imply both.

We should therefore leave the web metaphor behind, except in the very narrow ecological sense for which it was first created, to show that species in an ecosystem interact with each other.

And so to the various renditions of the tree of life, which attempt to convey not ecological, but evolutionary relationships. Whilst nobody has undertaken to represent the whole evolutionary tree in one diagram[686], there are many illustrations of different aspects of evolution.

Zimmer contrasts a classic, simple evolutionary tree with a modified, mangrove like version which he believes conveys something of the principle of symbiogenesis (figure 9)[687],

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[684] Yes, millions. Remember how many organisms creep upon and within us every day.
[685] Although if Peter Jackson could ever be persuaded to direct a film about the stream of life, with the sort of budget he can now command, we might come close.
[686] I think the most likely avenue of success is a three dimensional structure on a computer, which reveals as much detail as is known at all points in evolutionary history, and which the user can zoom in and out of and pan around. After a few aborted attempts I have decided to leave such an image to a future enthusiast with more computer and art skills than myself.
[687] Zimmer, *Evolution*, p. 109.

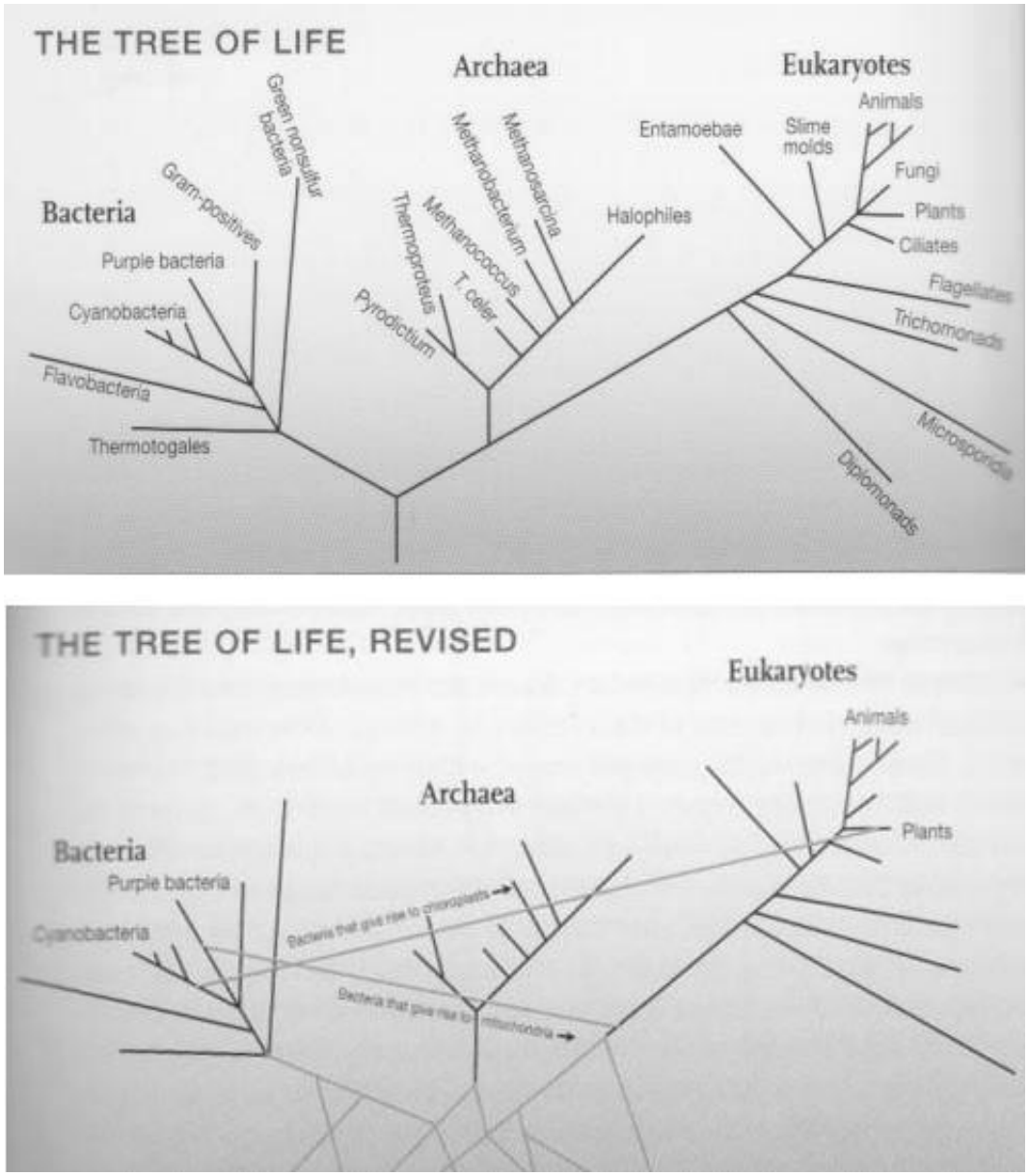

Figure 9. A traditional tree of life, and a symbiogenic "mangrove."

Margulis and Sagan's symbiotic illustration is much more organic. To produce it, however, they sacrifice even the little detail in Zimmer. Their illustration (figure 10)[688] misleadingly implies a single common ancestor for all life, against their text, which claims that life originally existed as a pool of microbes who frequently exchanged genetic material[689].

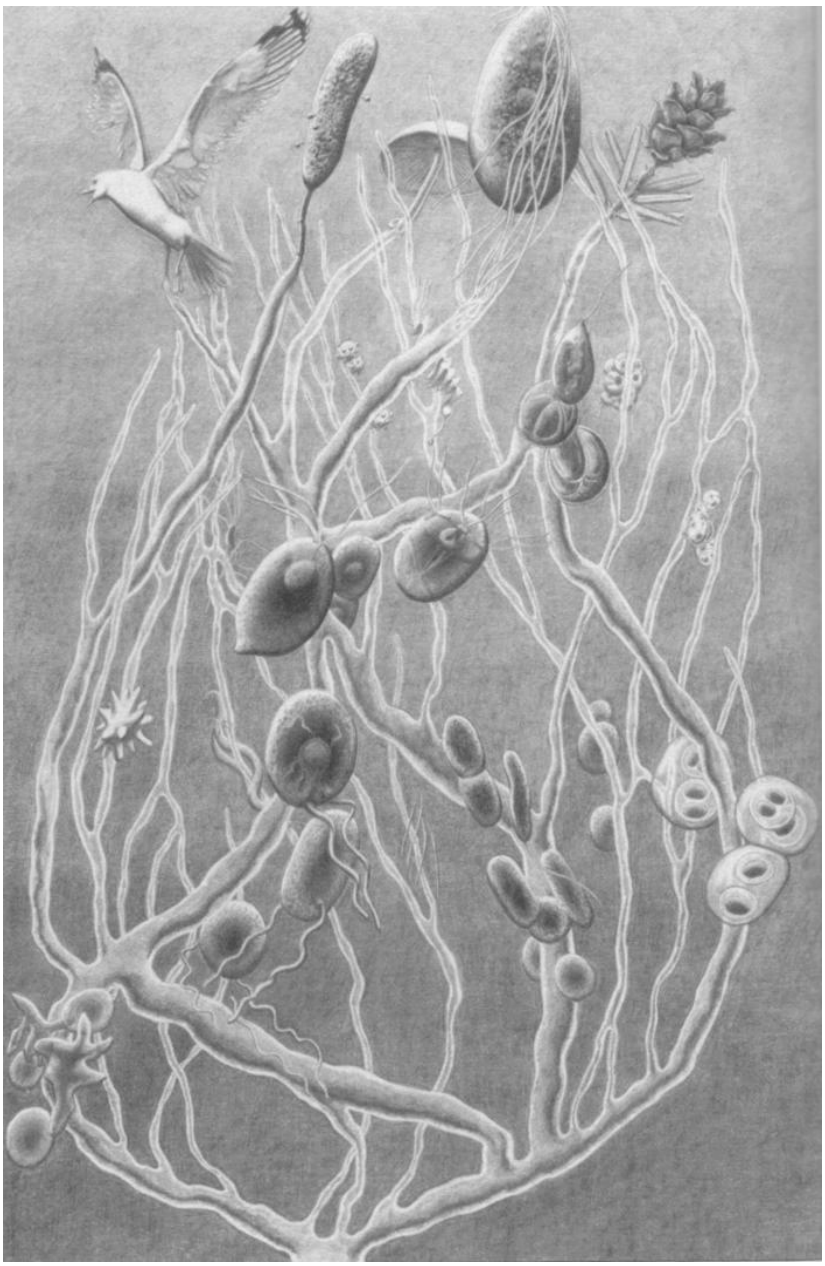

Figure 10. The 'tree of life' from a symbiogenesis perspective. An "individual" animal or species such as a seagull is not the result of genetic mutations through a single line of common ancestors, but is largely the result of the merging of the DNA of several distinct species, and even kingdoms, at various points in evolutionary history.

[688] From Margulis and Sagan, *Acquiring Genomes*, p. 34.

[689] Ibid, p. 7. In their framework, there is no such thing as a single microbial species (Margulis and Sagan, *Acquiring Genomes*, p. 55.) They claim that two common definitions of species, the biological species concept and cladistic approaches, are "entirely wrongheaded. (p. 7)" They follow the morphological definition, and since microbial morphology is so variable, it is pointless trying to classify groups of microbes into species. Even if one does accept the biological species concept (reproductively isolated populations of individuals) microbes do not qualify as species. Similarly, it is not possible to distinguish them cladistically except in small groups with short histories.

Both Zimmer and Margulis and Sagan ignore extinction events in their diagrams. The biggest of these events led to the extinction of most life on Earth at the time, so to neglect them in a diagram gives a decidedly false image of the changing shape of the bodies in which genes have been reproducing. The one figure I did find which attempted to convey the presence of extinction events did not do so to scale, nor did it show any other features of evolution (figure 11)[690]. So, of all the images I looked at, none graphically conveyed the fact that approximately 99.99% of species which have ever lived are now extinct. None showed the relative proportions of different kingdoms or phyla, for example the fact that the biomass of microbes approximates that of all eukaryotes. None show the time scale accurately[691], with microbes taking up almost the entire tree, with a small eukaryotic branch, little twigs for groups like mammals, and a few tiny leaves for the genus *Homo*. For example, the somewhat useful time line included in the Allan Gardens Digital Collection would be rendered much more helpful if the time axis was linear rather than constantly varying[692]. It may be that the magnitude of our evolutionary history is simply beyond illustrating at anything like the size of a book page. The American Museum of Natural History, for example, has a *simplified* reconstruction which measures 100 feet long[693]. A reconstruction which attempted to include every species would need to have between ten million and one hundred million end points[694], though less than two million have actually been described so far[695].

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[690] Richard Grigg, "Evolution with Extinction Events," (2003). available from http://www.soest.hawaii.edu/oceanography/courses_html/OCN201/Grigg/extinction.html. Used with permission on the condition that I acknowledge that the illustration was intended only as a very rough sketch for a lecture class, and not as a picture of "evolution" as a whole.

[691] Margulis and Sagan do have an excellent, non logarithmic time-line, which spans ten pages, at the scale of 1cm = 30my. The time-line is just that, however, not an evolutionary "tree." (Margulis and Sagan, *What Is Life?* , pp. 55-64.) It is a shame that their time line did not span the entire 200 page book, in which case modern *H. sapiens* would have occupied almost a whole millimetre!

[692] http://collections.ic.gc.ca/gardens/EVOLUTION%20TIMELINE/TIME%20LINE%20BASE-JPEG.html

[693] http://www.amnh.org/exhibitions/hall_tour/spectrum/flash/

[694] Korsmeyer, *Evolution and Eden*, p. 82.; Zimmer, *Evolution*, p. 182.; Margulis and Sagan, *Acquiring Genomes*, p. 52. Korsmeyer reports 100million species, Zimmer claims 7-10 million and Margulis estimates 10-30 million.

[695] Margulis and Sagan, *Acquiring Genomes*, p. 52.

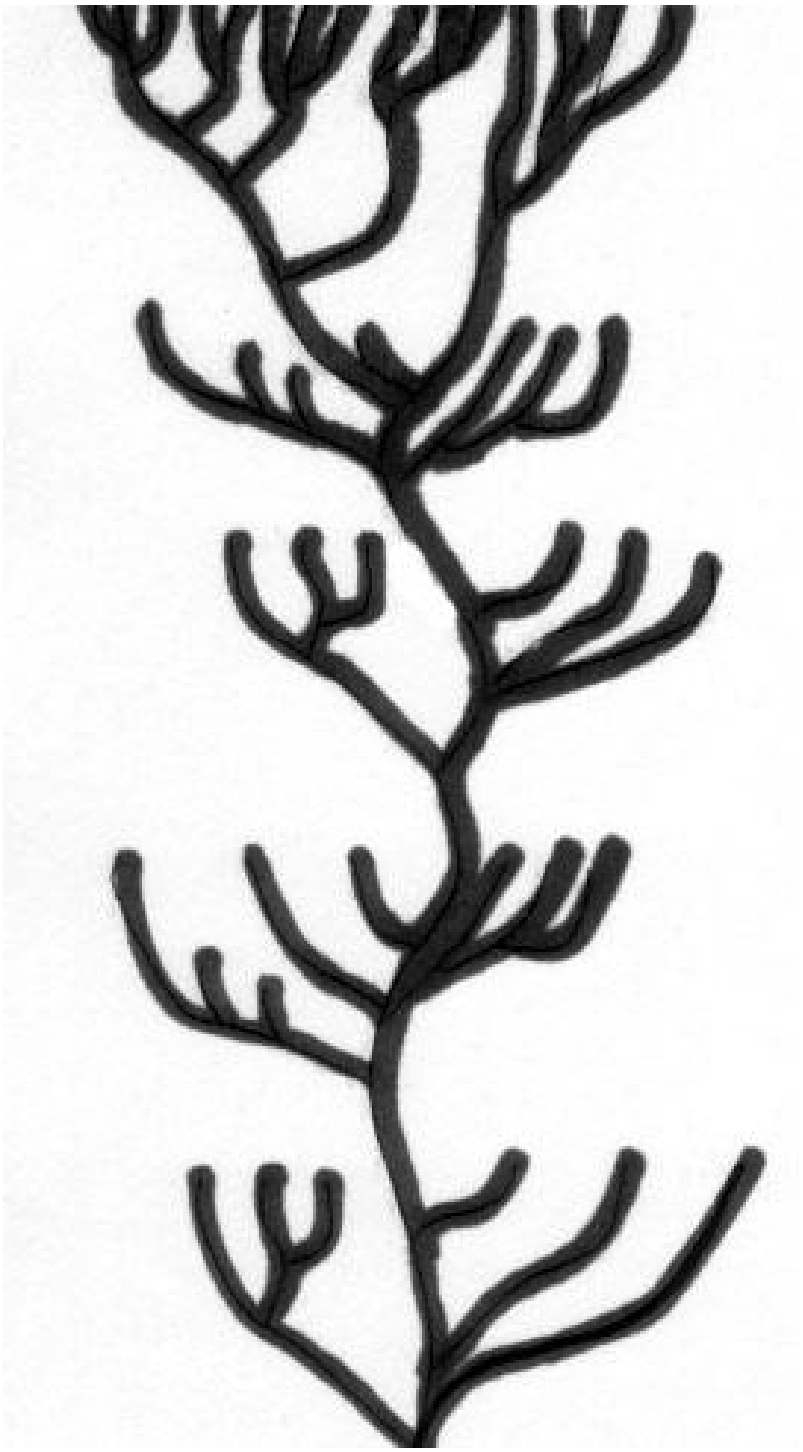

Figure 11. Very simplified, conceptual evolutionary tree showing major extinction events. Adapted from annotated version by Grigg for his course, Oceanography 201, taught at the University of Hawaii.

Simple as figure 11 is, I found its stream like appearance highly suggestive. Dawkins and Zimmer have already pointed to its usefulness as a metaphor for the way in which genes flow from one body

shape to another[696]. When diagramming life, however, Zimmer reverts to the tree metaphor, albeit a mangrove. The mangrove he constructs, however, does not actually look like any tree found in nature, except those artificially espaliered by humans (external designers) so that their branches fuse. The stream, which non-consciously creates its own channels, is a better model.

The metaphor of a stream also suggests the constraints which have been recognised as shaping evolution. Gould complained that Dawkins' *Mount Improbable* gives the false impression that environments are static[697], and life forms need to respond to them as inert "mountains," whereas in reality life forms shape their environment. In a stream, water does not flow in predefined channels, but creates its own, which then both constrain and positively enhance the direction of flow from then on. These channels are not fixed, but gradually change as a result of the interaction of the properties of the inert substrate and the water which follows.

Despite devoting a book to the idea of evolution as a river, Dawkins does not attempt to produce an actual diagram to convey the concept[698], and I could not find any other attempt to do so. I began to see why after countless miserable failures of my own. In the end, it was an artist's manipulation of a photo of a river which best seemed to capture the evolutionary story (figure 12)[699]. I slightly modified the picture, raising the top left stream into its current position, illustrative of the eukaryotic stream which separated from the microbial lineage (top right stream). Barely perceptible, somewhere on the left stream, lies the trickle *Homo*, and just barely seeping from its terminus is our species. Less satisfactorily, but still usefully, the same image can be considered to represent the eukaryotic world (or perhaps the multicellular world), with its mass extinctions[700].

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[696] It was something of a disappointment to discover Dawkins' book and the quote in Zimmer, since I had by then already "invented" the idea of replacing the tree of life with a stream, failed to draw it, and found the image which I eventually ended up with. The affirmation of knowing that others agree with an idea is a poor substitute for the exhilaration of thinking that one has created a new idea.

[697] Gould, *Self-Help for a Hedgehog Stuck on a Molehill*.

[698] He *does* have a picture of a forked stream with As, Cs, Ts and Gs floating in it, but it is hardly a picture of evolution, and not strictly representative of his actual idea, in which *genes* flow through time, not simply a random mess of separate nucleic acids.

[699] Anonymous and Jason John, "Tributaries," (2003). available from http://www.goetheanstudies.org/gscontent/media/objectslarge/tributaries-x.jpg.

[700] This is the opposite of the Necker cube example which Dawkins uses. In this case, different realities are revealed in the same image.

Figure 12. Photo of a river retouched by an anonymous artist, and further modified by myself. It is the best illustration of some of the major features of evolution mentioned in this thesis; some tributaries rejoin (following Margulis & Sagan); only a small fraction of life that has existed persists in the present (top of diagram); the termination of some tributaries is associated with rapid expansion in others, as in mass extinction events; microbial life (the centre stream) generates the tributaries, and remains a significant force throughout time.

How do we combine the evolutionary stream of life with the ecological web? Here we move into three dimensional space, something which we do not all do equally well. Imagine that the stream, rather than flowing across a two dimensional plane, is free to flow in three dimensions, like veins in a leg. Now take a cross section of the stream (imagine amputating the leg). You will see a mass of tributaries. Each one represents a line of evolutionary development which most people call a species. Now imagine drawing a fine line between each pair of species that have some sort of ecological relationship to each other. This is the simplified web of life, the cross section of the evolutionary stream at any point in time. As we move through time we see the web expand and contract, reshuffle its threads, being torn asunder and reforming. Evolution, in other words, moves us away from the illusion of a static, harmonious, designed web and shows us its dynamic and unpredictable nature. To see life we need to hold the web and the stream together. We end up with a three dimensional, pulsing, flow of life[701].

8.2.9 The rest of the image of life: Earth's four billion year future

Now we take the final step in imaging life on Earth, one which evolutionists often seem to underemphasise. As we shall see, it shakes the theological foundations. The mind numbingly amazing story of life on Earth is far from finished. All of the above diagrams subtly feed into our assumption that we are at the end point of evolution. In living memory not much seems to have changed, biologically. The consensus is, however, that Earth will exist for another seven billion years or so[702]. We need to double the size of the flow of life, to look over our shoulder as it were, and watch it meander through another seven billion or so years of life. When I presented this section of the thesis at the Christianity after Darwin conference, I asked the audience to close their eyes as I attempted to construct this mental picture for them. Unfortunately, you will need to keep yours open,

> Can you see this twisting, three dimensional stream, a network of trillions of channels, flowing through history towards us? Watch it rush through three billion years of life. Sometimes it nearly dries out, then it bursts forth in new patterns. It starts as a rumbling at the horizon, rushing forwards until it is about to bowl us over, as if we were standing on a desert with a wall of water rushing towards us, carving out millions of billions of trillions of channels as it goes.
>
> Good.
>
> Because now you need to look over your shoulder. Watch as this incredible powerhouse races off into the distance. Not far behind us the links which represent *H. sapiens* either dry up, or split off in new directions. The whole raging torrent continues on over the horizon, sometimes full, sometimes nearly empty, before finally drying up for good when the sun envelops Earth.
>
> We have just seen the best snapshot of the whole of life I can imagine. We have just seen the image of God[703].

---

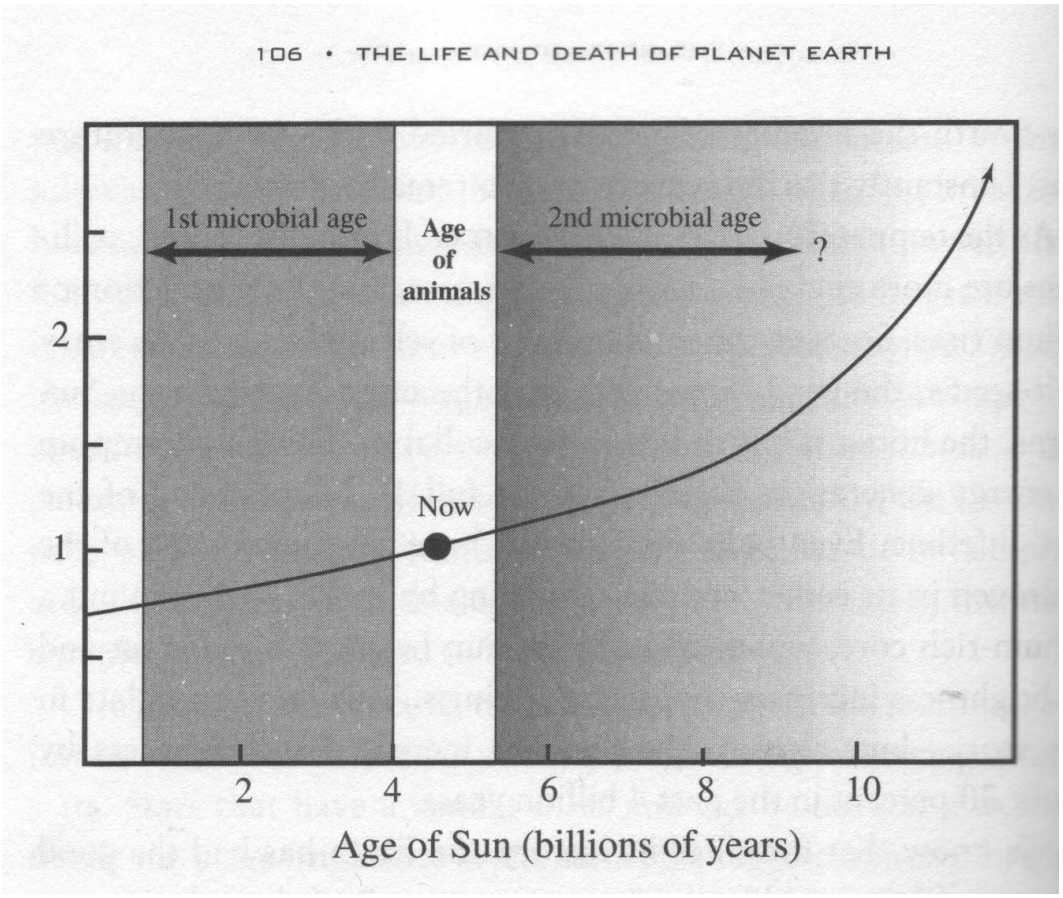
[701] Pulsing represents the punctuated nature of evolutionary change.

[702] Peter Douglas Ward and Donald Brownlee, *The Life and Death of Planet Earth : How the New Science of Astrobiology Charts the Ultimate Fate of Our World* (New York: Times Books, 2003), p. 168.

[703] Jason John, "Biocentric Theology and the Image of God" (paper presented at the Christianity After Darwin: Doing Theology in an Evolutionary Context, Adelaide, Australia, September 2004).

We need two calendar years for Mayr's chart of life on Earth. We need two people with arms outstretched to convey Dawkins' image, with humanity a fleck of dust between their fingertips. We need to redraw all of the evolutionary trees, but we do not know what the second half should look like! Will a nuclear war, or comet strike, wipe out all vertebrates[704]? Perhaps the reptiles will get a chance to reclaim the world from their mammalian usurpers. Birds, whose brains are organised quite differently from ours, could evolve a very different, yet highly complex, level of intelligence[705]. It may take decades, or millions of years for *H. sapiens* to cease to exist on Earth, but the biological record tells us that it is inevitable[706].

Whatever mass extinction events may occur, scientists are now fairly confident that they can foretell Earth's future, at least in broad brush strokes. If God is indeed guiding evolution, it is sobering to consider where it is being guided to. According to Peter Ward and Donald Brownlee, we live at approximately the mid-point of life on Earth, as I said above. We also, however, live at the mid-point of *animals* (figure 13)[707].



[704] Ward & Brownlee (Ward and Brownlee, *The Life and Death of Planet Earth : How the New Science of Astrobiology Charts the Ultimate Fate of Our World*, pp. 167-74.) offer a dramatic reconstruction of the aftermath of a comet strike, and the reasons why we would be almost certainly unable to avoid one even if we detected it in time. The most recent "near miss" was in 1995, when Earth's orbit crossed that of a 40km diameter comet. Had the paths coincided, 100 times more energy than at the dinosaur extinction would have been released

[705] John Brockman, *That Damn Bird* (2003 [accessed 2004 July]), available from http://www.edge.org/documents/archive/edge126.html.

[706] Gould reminds us that the common perception that we have halted human evolution through our technology and cultural developments is false. We know that evolution is a process of stability punctuated by rapid developments, so we would *expect* human genetic makeup to remain stable for periods of tens of thousands of years at a time (Gould, *The Structure of Evolutionary Theory*, p. 78.)

[707] Ward and Brownlee, *The Life and Death of Planet Earth : How the New Science of Astrobiology Charts the Ultimate Fate of Our World*, p. 106.

Figure 13. Figure from Ward & Brownlee, showing the short span of Earth history over which animals will exist in any significant numbers. Life will not go on gaining in complexity until the end of Earth, but will soon begin to become increasingly simplified, as oxygen hungry nervous systems become increasingly selected against.

Life will not continue to get more and more complex until the Sun finally consumes Earth. In a mere 500 million years all of the complex plants we now know will be extinct, killed off by plummeting CO_2 levels[708]. Grasses, algae and mosses will remain. Animals may then rapidly perish, but it is probable that they will linger for another 100 to 200 million years[709]. When I say animals, I do not mean humans, vertebrates, or indeed anything with much of a brain. In the minimal oxygen atmosphere, brains and nervous systems will be unsupportable, "…and the world will evolve into ever greater stupidity, with less complex sensory organs and behaviour.[710]" Truly the meek will inherit the Earth.

Eventually, as global temperatures reach 50°C there will be wholesale extinctions of even the insects on land. At 60°C only bacteria, algae and fungi will survive, and at 70°C bacteria will have the planet's surface to themselves[711]. Organisms in the ocean might survive a little longer than their terrestrial cousins, down in the cooler depths, but increasing global temperatures mean accelerated evaporation, and eventually Earth will be entirely without water, experiencing surface temperatures possibly as high as 1000°C.

So, the flow of life featured above is only half the story, we must add to it an equivalent length of flow, which might continue to diversify for a time. However, in the not too distant future, it will be reduced to a series of trickles, with the animal trickle comprised almost entirely of invertebrates. What we do know is that human beings will not be there at the end. I therefore offer my final attempt at the diagram of life on Earth in figure 14.

[708] Ibid, p. 108.
[709] Ibid, p. 124.
[710] Ibid, p. 125.
[711] Ibid, p. 128. This is *mean* global temperature. Once the mean temperature reaches just 38oC the equator will already be practically lifeless.

Figure 14. The tributaries showing a possible full history of life on Earth, including the impending extinction of complex plants and animals, following the scenarios described by Ward & Brownlee.

8.2.10 The rest of the image of life: spread throughout the universe

Finally, we must remember that the image of life is probably, or at least possibly, not confined to Earth[712]. It may extend back billions of light years before the image emerged on Earth, and continue for *trillions* of years after Earth is vaporised, before the universe finally becomes uninhabitable. So humans are a speck of the image of life on Earth, which may itself be a speck of the image of life in the Universe.

8.3 Summary

Humans are a flash in the history of the universe, a history with a much, much longer future than a past. If, as is likely, there is life elsewhere, then the universe story is played out over a stage which is orders *of orders of orders* of magnitude larger than the sphere of human activity, and we will almost certainly never see any of it.

Even on Earth, the human story is a tiny part of the story of life, and the *H. sapiens* story is even briefer still- 0.002 of one percent of it. We arrived at 11:56:30 in the *first year* of Earth's life. Earth has about another year to live, but *H. sapiens* will only be present for a few hours at the outside, a couple of days at the very most.

The driving force behind this story is the evolution of genetic material which has replicated itself in a dazzling array of life forms, using a bizarre concoction of strategies. The interaction between the genes and the environment of these life forms, lately modified by the conscious decisions of some more cerebral forms, made life as we see it today. There is constant interplay between the *unit* of selection (the gene), and the *target* of selection. Many believe that the individual organism is the target of selection, but Dawkins argues convincingly that phenotypes extend beyond individual organisms in a network, or web, of interactions.

While natural selection of random variation amongst individuals is the driving force of evolution, this is constrained and complemented by a variety of other factors. As certain body plans become more complex, the number of simultaneous mutations required to change them successfully escalates, and so therefore does the probability of them being conserved. Symbiogenesis provides an alternative pathway for the accumulation of new genetic material in organisms. Random events also have a significant influence on which organisms survive into the next generation, from the individual level to the mass extinction events which repeatedly occur on Earth. Mass extinctions are just one phenomenon which assures that evolution does not occur at a constant rate, but in punctuations.

There is no evidence that evolution has been guided by any external force or intelligence, God included. Whilst there are certain trends within certain lines of evolutionary development, there is no evidence of an overall direction, and in the near future all trends towards complexity will reverse, first in plants and then animals. It is also meaningless to talk of any organism as being better, or more advanced than others, there are simply different ways of surviving in a highly diverse environment. It is true that if we look within very discrete lines, we can talk of development of certain qualities. For example, within the line *Homo* the very limited fossil evidence implies an increase in bipedalism, language and "culture." Interestingly, brain size has not steadily increased- Cro Magnon people had larger brains than modern humans[713], as did Neanderthals[714].

Every aspect of *H. sapiens* which has been held up as evidence of human uniqueness has been demonstrated to be a difference of degree, not ontology.

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[712] Page 64.

[713] Jim Foley, *Fossil Hominids: Cro-Magnon Man* (11 November 2004 c2004 [accessed November 2004]). Cro-Magnon people are not a separate species, they are one of the "ancient *Homo sapiens*"

[714] Sherman Clark, *Homonid Evolution* (2000 [accessed November 2004]), available from http://www.unc.edu/courses/2000fall/geol018-001/Lecture40.html.

Our genesis was made possible only by an extraordinarily long, highly contingent process, involving an enormous amount of both pain and pleasure in billions of organisms, underwritten by the non-conscious and nonmoral genes which code for our construction. Our biological form is the result of "blind, pitiless indifference."

But this indifference is not the only source of who we are, as illustrated in the story of the evolution of sex. The first sexual encounters were not *even* encounters, as non-conscious organisms cast their gametes to the water or wind. The latest practitioners experience the same basic event as an often extremely pleasurable pastime, which bonds small primate communities together so effectively. Life "uses" sex to combat parasitism. But many organisms *use* sex for pleasure, especially *Pan bonobos*[715], *H. sapiens* and dolphins[716]. Out of pragmatic genetics has emerged emotion, double edged sword that it is.

Life on Earth has survived a number of cataclysms which reduced it to a trickle, and without which we would not exist. Even so, the human mediated loss of biodiversity is probably unique; the largest in total magnitude though not percentages, and initiated by a single, partially rational species. Nevertheless, the life forms which have most shaped the biosphere as we see it today are the microbes. Relative to them, the impact of *H. sapiens* is minimal.

Even without mass extinctions, death and pain are constitutive of the web of life. This web of ecological relationships is far less benign than many environmentalists, in and outside the church, imply. It is neither delicate, nor static, nor intrinsically cooperative. The participants in the web of life overwhelmingly interact unconsciously and amorally, and so therefore is the web itself. Pain is an essential warning mechanism to protect us from the environment and other organisms which try to exploit us. Individual deaths are essential to make way for new lives, just as extinctions are a prerequisite for the emergence of new species.

Yet from this amoral system has evolved consciously moral creatures, certainly within the primate line. Morality has not entered the world as an external "spiritual" force helping us to overcome our beastly, evolved natures. It evolved from the very same processes responsible for our biological evolution. Morality probably evolved to provide meaning systems within which the need for bondedness and autonomy could be met within small social groups, and therefore possibly exists amongst cetaceans also. As expected, morality itself evolves in response to changes in the environment, and some systems of morality, or the communities who bear them, go extinct in the face of competing systems of meaning.

As humans developed agriculture and technology they began an extremely rapid journey away from the environment of the Pleistocene in which our brains and emotional hard-wiring evolved. A plethora of meaning systems resulted, but there is a general trend away from using animals, the Wild Other, to depict the gods. Agricultural societies generally moved towards female fertility gods, which related to the changing seasons. In the antecedents of the Judeo-Christian-Islamic religions they were in turn replaced by the gods of the horse riding tribes, whose theology was shaped by exposure to the elements on long, dangerous journeys, separating them from the women and children. This theological evolution, as told by the social scientists, is, like biological evolution, is not a story of progress or improvement, but of adaptation to a changing environment.

If anything, it may be a retrograde step, since it reflects the beginning of what has now become the extreme isolation of many humans from the rest of life around us, especially non domesticated life. Our Pleistocene adapted, biophilic psychological core seems to be suffering from this increasing

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[715] de Waal and Lanting, *Bonobo: The Forgotten Ape*, pp. 35, 105, 12, 58.;Potts and Short, *Ever since Adam and Eve*, p. 34.
[716] Jared M Diamond, *Why Is Sex Fun?: The Evolution of Human Sexuality*, *Science Masters* (not stated: Basic Books, 1998), p. 3. The anecdotal story of an experiment in human/dolphin cohabitation is contained in Margaret Howe, *Woman and Dolphin: Margaret Howe and Peter, Pam, & Sissy Dolphins (Diary Entries)* (1965 [accessed 10 August 2004]), available from http://www.tomigaya.shibuya.tokyo.jp/lilly/womandolph01x.html.

separation from the Wild Other. A symptom, and partial remedy, may be our increasing fascination with technological objects.

So on the one hand we are being encouraged to re-engage with the Wild Other for our well being. On the other hand, technology is allowing us to see that "Other" is a constructed meaning system. Although this construction is essential for the survival of biological organisms, it is superimposed over a fundamentally continuous, pulsing stream of life (or genes, body plans, emotions, language, morality, or any other quality we care to mention). The best overarching image of life is a three dimensional pulsing flow, spanning some seven billion years on Earth.

Christian theology claims that this pulsing flow of life is in some way a creation of God, who is a non biological person. God, then, may see life, relate to life, free of the meaning system we have had to impose upon it to survive. If God is creator of life, then life should tell us something about God. The image of life presented here, and the sort of relationship it implies between God and creation differs markedly from that presented in Genesis. Since Christian theology has traditionally grounded itself in Genesis, we might expect to conclude quite different things about God and ourselves in light of the above story, and the image of life it leaves us.

We will see that the scientific stories have an impact upon all three of the propositions in the anthropocentric theology found within the Uniting Church, as I intuitively expected. That is, the notion that humans alone are created in the image of God, charged with some form of dominion over the rest of life, and responsible for the fall of the whole of creation into something less than it was created as. Surprisingly, to me at least, was that the science stories also called into question the more biocentric elements found in the Uniting Church resources, and much of the wider ecotheology movement which they reflected. I will now survey how theologians have responded to these challenges, before moving on to propose a biocentric framework which is, I believe, more consonant with the information we have from the life sciences.

9 Theological evaluation

9.1 *H. sapiens* as the image of God

9.1.1 Summary of the scientific data

We have seen that there is no biological property of *H. sapiens* which is ontologically distinct from other animals. While the relatively massive and well developed human brain has enabled the emergence of intelligence, emotion and culture, even these things are possessed in other animals to different degrees.

We have also seen that the images which humans use to represent the gods have themselves evolved over millennia, with the representation of the gods as animals giving way to the image of the goddess, which itself was recently almost entirely replaced by the image of the male God in those religions rooted in Judaism.

9.1.2 Theological responses

What the author(s) of Genesis 1 meant by the image of God has been extensively debated by biblical scholars and theologians, as comprehensively reviewed by Claus Westermann[717]. He makes the

[717] Claus Westermann, *Genesis 1-11: A Commentary* (Minneapolis: Augsburg Publishing House, 1984). See also Noreen L. Herzfeld, *In Our Image : Artificial Intelligence and the Human Spirit*, *Theology and the Sciences* (Minneapolis: Fortress Press, 2002), pp. 10-32. She describes three approaches common this century; ontological, functional and relational.

interesting point that although the literature on this topic is nearly limitless, it is not a major preoccupation of the biblical witnesses themselves, being mentioned again only in Psalm 8[718].

By far the most common interpretation is that the image of God consists in some sort of quality or capacity, for example, "personality, understanding, the will and its freedom, self-consciousness, intelligence, spiritual being, spiritual superiority, or the immortality of the soul.[719]"

Pope John Paul II follows Aquinas in locating the image of God in human speculative intellect[720], which is evidence of the unique nature of the human soul. Protestant theologians also looked to biological and intellectual properties of humans as evidence of the image of God. Karl Barth, who had a major influence within Protestantism[721], believed that culture was a, "particular human activity.[722]" This undergirded his claim that,

> "Man [sic]… is elected… as the being specially endowed by God. This is manifest in his special bodily nature, in which he of course has ever so much in common with plant and animal, and also in the fact that he is a *rationally thinking, willing and speaking being destined for responsible and spontaneous decision* (emphasis mine).[723]"

Mark Brett represents a different line of interpretation. He points out that the symbol, *image of God* was already in use when Genesis was compiled, and referred to the functional authority of kings to rule in the place of the gods. It was they alone who were bearers of the image of God. Genesis, he claims, uses the symbol as a democratising protest against the prevailing culture, subverting the use of the symbol to claim that *all people* are bearers of the image[724].

Theodore Hiebert also focuses on the pre-existing use of the symbol, and also claims that the image of God was used to say something about the function, not ontology of humans[725]. Far from being used as a democratising influence, however, Hiebert sees the symbol being adopted by the priests responsible for this part of Genesis to legitimate their own position in Israelite society. All people were to the animals as the priests were to all people: the divinely appointed rulers[726].

Westermann himself disputes both the functional and 'spiritual quality' interpretations. He agrees with those who say that the image of God is not about what humans are, or how they relate to the other animals[727]. The image of God, he believes, was intended to say something about the relationship between humans and God. According to the priestly redactors of Genesis, humans were created for relationship with God, they are enough like God to be able to respond to God[728].

Despite all the differences in these interpretations and the many others Westermann lists, the unanimous assumption is that the image of God *is to be found solely in human beings, and constitutes*

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[718] Westermann, *Genesis 1-11: A Commentary*, p. 148.
[719] Ibid, p. 149.
[720] Pope John Paul II, *On Evolution*.
[721] (H. Paul Santmire, "Healing the Protestant Mind: Beyond the Theology of Human Dominion," in *After Nature's Revolt : Eco-Justice and Theology*, ed. Dieter T. Hessel (Minneapolis: Fortress Press, 1992), p. 66.
[722] Karl Barth, "The Humanity of God," in *The Humanity of God* (Richmond: John Knox Press, 1960), p. 54.
[723] Ibid, p. 53.
[724] Mark Brett, "Earthing the Human in Genesis 1-3," in *The Earth Story in Genesis*, ed. Norman C. Habel and Shirley Wurst (Sheffield: Sheffield Academic Press, 2000), p. 96.
[725] Theodore Hiebert, "The Human Vocation: Origins and Transformations in Christian Traditions.," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. 138.
[726] Ibid.
[727] The passage which refers to the image of God probably initially was an independent piece, only taking its place after the creation of animals much later (Westermann, *Genesis 1-11: A Commentary*, pp. 156-57.
[728] Ibid, pp. 156-58.

an ontological gap between humans and other animals[729]. Whether it is a characteristic, a functional role, or the ability to relate to God, the assumption is that only humans have it or can do it.

Let us return to the majority interpretation, that the image relates to a human characteristic. How do theologians respond to the insights of evolutionary biology, which demonstrates that the human characteristics most commonly used as evidence that we alone possess the image of God, are not ontologically unique to humans?

The official Catholic response to scientific speculation about human nature is, as we have seen, to claim privilege for the magisterium, and the revelation from God that humans *are* ontologically different, irrespective of anything science may claim. The difference is due to the unique human soul, which originates external to biology, being somehow imparted directly from God[730].

The position is well summarised by Michael Schmaus in his *Dogma 2: God in Creation*, "… there is between man [sic] and the rest of creation *a fundamental and irreducible distance* (emphasis mine).[731]" He acknowledged that most Catholic theologians of his day (1969) accepted a *moderate* doctrine of evolution, but was adamant that for Catholics, "… although the human body and psyche arise out of the continuous process of evolution, the human spirit does not; the human spirit… originated as a new principle of being and activity.[732]"

Catholic theologians, then, are bound to reject the implications of science on this point. Edwards, for example, simply states that although the cosmology of Genesis 1-3 is not binding on modern Christians, its theological insights are, including the insight that humans are created in the image of God[733].

Edwards reveals that a number of Catholic theologians, including Karl Rahner, share his discomfort with the idea that God intervenes in history to implant the human soul either in the human species, or in individual people[734]. Nonetheless, he affirms the radical distinction between humans and other animals in a way which can only be considered ontological,

> "It is this one divine act that enables what is radically new to emerge in creation. Above all it enables the emergence of self conscious and spiritual human beings. Each of them is created in radical uniqueness in the image of God… Each of them is destined for eternal life… Are there other such creatures in the universe? - Theology can't say yet.[735]"

By remaining silent on the possibility of other creatures in the universe being like us, Edwards holds open the possibility that the image of God may be broader than we conceive it to be, but he clearly does not see any other signs of the image here on Earth. This is a position which he reiterated in a recent theology -science dialogue[736], and in a more fully developed paper in the same year[737].

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[729] Ibid, pp. 157-58.
[730] Michael Schmaus, *Dogma 2: God and Creation* (London: Sheed & Ward, 1969), p. 129.
[731] Ibid, p. 111.
[732] Ibid, p. 125.
[733] Edwards, *The God of Evolution: A Trinitarian Theology*, p. 11.
[734] Ibid, p. 75.
[735] Ibid.
[736] Denis Edwards, "Response to Nancey Murphy," in *Interdisciplinary Perspectives on Cosmology and Evolutionary Biology*, ed. Mark Worthing (Adelaide: Adelaide Theological Forum, 2002), p. 95.
[737] Edwards, "Evolution and the Christian God," p. 179.

The Roman Catholic dialogue with science on this point, then, is impossible[738]. The same is true of the Orthodox Churches whose theology, for similar reasons, "… starts and ends by placing human beings at the centre," claiming that we are the centre and height of God's creation[739].

Similar sentiments dominate Protestantism, though for different reasons. Thomas Torrance, an influential Protestant thinker who has written on science and theology, is a contemporary example,

> "From the perspective of theology man [sic] is clearly made *the focal point in the interrelations between God and the universe*. He is given a special place within the creation with *a ruling and priestly function* to perform toward the rest of created reality. All lines of rationality and order… *depend on his destiny* (emphasis mine).[740]"

> "The fact that God has taken the way of becoming man [sic]… immensely reinforces *the unique place of man [sic] in the universe*.[741]"

Although his conclusions are very similar to the Catholic position, Torrance does not elaborate an ontological defence. For him it is enough that God became a human being. Although Torrance values the dialogue between science and theology, it is probably not his primary focus. Of his many books, only a few, and those predominantly early in his career, deal primarily with science. These tackle cosmology more than evolutionary biology, so his views on humankind's ontological distinctiveness is not directly challenged by his dialogue. According to Polkinghorne, Torrance is one of those theologians who pay, "…*some* attention to science in their writings (emphasis mine),[742]" which may have something to do with his enthusiasm for Karl Barth[743].

Barth determinedly avoided all scientific questions, claiming that they had nothing to do with the theological problem of creation[744], although he did admit that science may yet make discoveries important for theology[745]. For Barth, it was important to engage with Genesis as a saga, in the light of Christ, not science, and so he avoided dealing with the natural sciences on principle[746]. For Barth, although theology is the, "science and doctrine of God,[747]" *Christian* theology is really, "The-anthropology," a doctrine of God and *man*[748]. The evangelical theology he championed was, "… the science and doctrine of *the commerce and communion between God and man [sic]*, informed by the gospel of Jesus Christ as heard in Holy Scripture (emphasis mine).[749]"

Barth's refusal to engage with science was a reaction against what he saw as an unhealthy preoccupation with that very engagement by his predecessors[750]. This is unfortunate, since Barth

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[738] Pope John Paul II acknowledges as much in his addresses on evolution. (Pope John Paul II, *On Evolution,* Pope John Paul II, "The Theory of Evolution and the 'Gospel of Life'," *Catholic International* 8, no. 1 (1997).)
[739] Tsehai Berhane-Selassie, "Ecology and Ethiopian Orthodox Theology," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), pp. 155, 70.
[740] Thomas Torrance, *Divine and Contingent Order* (1981), p. 129.
[741] Ibid, p. 138.
[742] Polkinghorne, *Scientists as Theologians*, p. ix. In this list he includes Hefner, Moltmann, Murphey, Pannenberg and Peters.
[743] Seen, for example, in the numerous texts he produced about, and even with, Barth (Karl Barth, Thomas F. Torrance, and Geoffrey William Bromiley, *Church Dogmatics. Index Volume with Aids for the Preacher* (Edinburgh: T. & T. Clark, 1977), Thomas Torrance, *Karl Barth : An Introduction to His Early Theology 1910-1931* (London: SCM Press, 1962), Thomas Torrance, *Karl Barth, Biblical and Evangelical Theologian* (Edinburgh: T & T Clark, 1990).) A second edition of Torrance's *Introduction to Barth* was published in 2000 (Thomas Torrance, *Karl Barth : An Introduction to His Early Theology 1910-1931* (Edinburgh: T&T Clark, 2000).)
[744] John Dillenberger, *Protestant Thought and Natural Science* (Indiana: University of Notre Dame, 1960), p. 258.
[745] Ibid.
[746] Ibid, p. 261.
[747] Karl Barth, "Evangelical Theology in the 19th Century," in *The Humanity of God* (Richmond: John Knox Press, 1960), p. 11.
[748] Ibid.
[749] Ibid.
[750] Ibid.

opposed those who, in his view, made humans the measure of all things. But by limiting theology to the discussion of God and humans, he missed one of the most powerful tools for relativising the position and importance of the human - i.e. evolutionary biology. Protestant theology should be open to this relativising because it generally rejects the body/soul dualism which the Catholic position rests on, having offered a sustained critique of it for decades[751]. Indeed, Protestant theology has always tended to have a more generationist view of the soul, in which the soul is simply a, "dimension of the material world.[752]"

If the soul is entirely a dimension of the material world, then Protestant theology has no recourse to an ontologically different soul upon which to hang the image of God. We must continue the dialogue on this most crucial issue, to see whether theology can reconceive of the image of God in a way which is consonant with the scientists' conclusions. One approach could be to simply to do away with the concept of the image of God.

9.1.2.1 There is no image of God

It has been assumed for most of Christian history that since God designed or created Earth and life on it, we could see something of God by looking at 'nature'. Since the science story finds no evidence of external guidance shaping the development of life, we could conclude that life is no image of God at all. This could be consistent with the Orthodox tradition, for example, which emphasises the inscrutability of God[753], and in the Protestant tradition, many theologians admit that the universe is at least partly independent of God[754]. To the extent to which the latter is true, we could say that the universe, or life, is not the image of God. This would also be true of us, to the extent that evolution, rather than God, is responsible for our biology and soul.

The "image of God" symbol could be retained for Christ, who is the image of what the divine/human nexus looks like. In other words, he is the image of God for *we humans*, but not the image of God *in toto*.

However, as we have seen, being in the likeness of God is only part of what it means to be in God's image. The image of God is primarily a claim that its bearer is able to be in *relationship* with God, and secondarily is therefore enough like God to have a relationship. To declare that there is no image of God, then, is to declare that there is no relationship with God. If this were true, there would be nothing left to say, and no Christianity.

For now, then, I retain the idea that there *is* an image of God, a relationship with God, but reject the idea that this can be constrained to human beings alone, since there is no ontological distinction between them and other organisms. How might we go about broadening the image of God?

First we must ask whether Christians *can* broaden the image of God. Since it is such a central image in Christian theology, will theology still be Christian if it changes it substantially? This question was first addressed decades ago in the Christian feminism movement, and the reactions to it. I will consider it by briefly reviewing the impact of feminism on another central Christian claim about God, that God is Trinity. Feminism must be able to talk of God as Trinity if it is to claim a place within Christianity, as must biocentric theology. But it must be able to talk about Trinity in a way which is

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[751] Andrew Dutney, *Ensoulment (Briefing Notes)* [email attachment] (2003 [accessed August 2004]). It is widely rejected by those theologians engaged with the sciences, e.g. Barbour, *Nature, Human Nature, and God*, pp. 6, 65, 71-82, Ian G Barbour, *Religion in an Age of Science* (London: SCM, 1990), pp. 177,208-09, Christian de Duve, "Lessons of Life," in *Many Worlds: The New Universe, Extraterrestrial Life and the Theological Implications*, ed. Stephen Dick (Pennsylvania: Templeton Foundation, 2000), p. 8, Arthur Peacocke, *God and the New Biology* (London, Melbourne: J. M. Dent & Sons, 1986), pp. 88-90, Polkinghorne, *Scientists as Theologians*, p. 29.
[752] Dutney, *Ensoulment*.
[753] Platon Igumnov, "Creation from the Viewpoint of Dogmatic Theology," in *Justice, Peace and the Integrity of Creation : Insights from Orthodoxy*, ed. Gennadios Limouris (Geneva: World Council of Churches, 1990), p. 84.
[754] Torrance, *Divine and Contingent Order*, pp. 71-72.

consonant with feminism. In other words, feminist Christians had to demonstrate that the traditional Christian formulation, Father, Son and Holy Spirit, is not *the only* possible formulation for the Trinity.

9.1.2.2 From an androcentric to anthropocentric image

I have already mentioned that the image of God used to be confined to men alone in Christian tradition. Gradually, it was acknowledged that women, too, were bearers of the image, though often in a different sense[755]. Yet the language used to describe God, in official theological texts and weekly worship, remained thoroughly androcentric, and God as Trinity meant exclusively God as Father, Son and Holy Spirit.

In reaction, some early feminists, especially ecofeminists, simply rejected the male God, and transferred their allegiance to the goddess. Rosemary Radford Ruether, however, argues that this is inadequate[756] since it merely replaces one distortion with another. Rather, our images of God must embrace *both* male and female if they are to be theologically adequate,

> "Because how we image God is precisely the revelation of God that we access, expanding our image to honour the equality of women in the image of God by imagining female metaphors of God is more than a matter of forced correctness. It is a symbol and symptom of a collective work of *metanoia*.[757]"

But is this *metanoia* possible in the Uniting Church? In its opening section of the *Basis*, the uniting denominations declare of their union that, "They pray that this act may be to the glory of God the *Father, the Son* and the Holy Spirit (emphasis mine)." This masculine Trinitarian formulation repeats throughout the *Basis*, and places it squarely within the majority tradition of the church since formalised at the first council of Constantinople in 381[758].

Uniting Church members cover the spectrum from ecofeminists calling for inclusive language for the image of God[759], to those who see the traditional masculine labels as the *only* labels. When working in a local congregation I surveyed the members' attitude to calling God "She" in worship. The women's responses ranged from enthusiastic acceptance to threats to leave the church if that happened[760]. Female language about God has been enthusiastically adopted in some congregations, including the Mustard Bush faith community[761], the explicitly pro-feminist Fitzroy Uniting congregation[762], and the Murray Bridge late morning service[763], but they are a tiny minority in the Uniting Church.

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[755] Ruether has a useful survey of this history, from the original Genesis passage, through Catholicism to Barth (Rosemary Radford Ruether, "*Imago Dei*, Christian Tradition and Feminist Hermeneutics," in *Image of God and Gender Models: Gender Models in Judaeo-Christian Tradition*, ed. Kari Borresen (Minneapolis: Fortress, 1995).)

[756] Rosemary Radford Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing* (San Francisco: Harper, 1992).

[757] Rosemary Radford Ruether, "Pneumatic Nudges: The Theology of Moltmann, Feminism, and the Future," in *The Future of Theology: Essays in Honour of Jürgen Moltmann*, ed. Miroslav Volf, Carmen Krieg, and Thomas Kucharz (Michigan: William B. Eerdmans, 1996), p. 149.

[758] Although the phrase, "Father, Son and Holy Spirit" is found in Matthew 28:19, "Scripture is like a broad stream with many currents. Not every current leads to Nicea and Chalcedon…"(Chris Mostert, "The Place of the Bible in Preparing and Receiving Doctrinal Statements," *Trinity Occasional Papers* 1, no. 1 (1981): p. 23.) Although the Trinitarian formula was in frequent use by the beginning of the second century, for example by Clement and Ignatius, the coequal divine Trinity does not become binding orthodoxy until Constantinople. For a very brief summary see Edwards, *The God of Evolution: A Trinitarian Theology*, p. 78.

[759] Dorothy Lee, "Naming the Self-Naming God: A Position Paper on Inclusive Language in Theology and Liturgy," (Parkville: Theology and Discipleship, The Uniting Church in Australia, 2002).

[760] Survey I conducted at Indooroopilly Uniting Church Evening Congregation, January 6th, 2000.

[761] http://www.musbush.ucaqld.com.au/

[762] Coralie Ling, *Making Wide the Circle: Fitzroy Uniting Church* (January 2001) [internet] (Ecumenical Review, 2001 [accessed March 2003]), available from http://www.findarticles.com/p/articles/mi_m2065/is_1_53/ai_71190357.

[763] I attended this congregation for about six months, and God was represented in female language in sermons, songs and prayers during that time.

Amongst ministers and scholars in the Uniting Church a similar disagreement exists. Drasko Dizdar, when a final year ministry candidate, spoke of the Trinity as God beyond-all, God-with-us, and God-within-all[764], and avoided using the male pronoun for God. Stephen Reid argues that,

> "The use of 'Father', 'Son' and 'Spirit' as language for talking about God is clearly a metaphorical use of these terms. Whether there is a primary literal use is a matter debated by some philosophers. But they are clearly not meant literally of God.[765]"

Using Lindbeck's cultural-linguistic approach to the study of religion[766], Reid argues that the theological rule laid down in the *Basis* is that God must be understood in Trinitarian terms. The labels for those terms are secondary and malleable[767]. In response to feminist concerns about the patriarchal and kyriocentric implications of "Father, Son and Holy Spirit," the labels ought to be, or at least can be, changed to better represent Trinity to a modern community.

In contrast, Rosalie Hudson argues that feminist-inspired images of God are similes, whereas God as "Father, Son and Holy Spirit" is a revelation from God and is *the* way that the Trinity is to be described[768]. She quotes with approval *One God One Lord One Spirit*,

> "Christian belief in the fatherhood of God was never intended to imply that God is male…As a human being, Jesus is male. But within the persons of the Trinity, there is no gender.[769]"

What Hudson does not address is that for Christians today, if not for Christians of all times, calling God Father and Son *does* imply that God is male. Whether it was meant to or not, calling God by exclusively male pronouns made Christians think of, and relate to, God as male. Whatever the validity of her rejection of new names for God on the grounds of inclusive language, Hudson ignores the far more important argument that our language about God must communicate as best it can who God is. Continuing to speak of God using exclusively male pronouns in the twenty-first century absolutely fails to do that, and miscommunicates the nature of God to most hearers.

The issue of Trinity Occasional Papers that Hudson's article appears in contains a number of other papers presented to the *Commission on Doctrines and Liturgy* in 1989. One of them, by Arthur Jackson, focuses on the charismatic experience but, in passing, offers some reflections on names for God. He begins by acknowledging that, "Anyone who cannot see the point of trying to devise inclusive language must be very insensitive.[770]" He correctly rejects, "Creator, Son and Holy Spirit" as an alternative, pointing out that in the biblical witnesses the Son and Spirit are also involved in the process of creation. He also points out the inconsistency of retaining Father but calling the Spirit "She", since although *ruach* is feminine, *pneuma* is neuter[771], and it is this on which Trinitarian theology is based in the New Testament[772]. I would add that speaking of one member of the Trinity as male and another as female actually *increases* the gendered nature of the Trinity rather than decreasing it.

Jackson would be happy to call God Mother in some new prayers and Father in traditional ones, even though he finds it,

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[764] Drasko Dizdar, "Doing Theology Here and Now: Towards a Liberating Contextual Theology," *Trinity Theological College Special Studies* (1990): p. 5.
[765] Stephen Reid, "On the Theological Authority of the Basis of Union," *Uniting Church Studies* 1, no. 2 (1995): p. 54.
[766] Lindbeck, *The Nature of Doctrine*.
[767] Reid, "On the Theological Authority of the Basis of Union," p. 59.
[768] Rosalie Hudson, "Who Speaks for the Trinity?," *Trinity Occasional Papers* 9, no. 1 (1990).
[769] Link (ed.) Hans-Georg, "One God One Lord One Spirit (Faith and Order Paper No. 139)," (Geneva: World Council of Churches, 1988), p. 25.
[770] Arthur Jackson, "Charismatic Worship: Trinitarian Theology," *Trinity Occasional Papers* 9, no. 1 (1990): p. 32.
[771] See also Thayer and Smith, "Greek Lexicon Entry for *Pneuma*," in *New Testament Greek Lexicon* (2003).
[772] Jackson, "Charismatic Worship: Trinitarian Theology," pp. 32-33. Here Jackson has Moltmann especially in view.

> "…hard to call God 'Mother'- perhaps the result of being 70 years old. Teaching old dogs new tricks is easier than teaching old Christians new prayers"[773].

What is most important for him is what Reid might see as another "rule" to lay alongside the rule of God as Trinity: There is an intimacy within the Trinity which must be preserved by language about God. So Jesus' cry to God as *Abba* reveals an intimacy that must be preserved. For this reason Jackson believes that *Abba* language must be retained, but can be supplemented. We should not replace Father with Parent, as no child calls their parent, "parent", and so the relational warmth implied by the metaphor is lost. Rather, God is best referred to as Father and Mother, though for a younger generation perhaps mum and dad is better at preserving the intimacy Jackson desires.

In the same issue of Trinity Occasional Papers is a one page summary of a paper by Pat Baker[774]. The editor explains that space precluded all the papers being included, but does not explain why the feminist article is therefore reduced to one page, whilst the conservative nine page article by Hudson is reproduced in full. The editor tells us that Baker describes herself as "… a feminist Christian with a case to put in what is probably a no-win situation," who seemed to believe that the commissions were unlikely to agree with her attempts to reformulate the Trinity, since, "… arguing against the traditional Trinitarian formula in a group like this is like attacking motherhood and parliamentary democracy." According to the summary, Baker believes that all images used in the names and descriptions of God are metaphors, and that church tradition is "fraught with examples of the failure to remember what metaphor is."

The alternative formulations she suggests for the metaphor of Trinity are:

Creator, Redeemer, Sustainer
Source of all being, Eternal Word, Holy Spirit
Maker, Keeper, Lover
Creator, Liberator, Comforter
Creator, Christ, Holy Spirit
God who made us, God who saves us, God who keeps us all

Lover, Beloved, Love
Abba, Servant, Paraclete.

The first six identify the first person in the Trinity as the only creative agent, and I therefore reject them following the logic of Jackson, above. The seventh casts the 'son' in a passive role and looks odd alongside the traditional affirmation that "God is love," not just the third person in the Trinity. The eighth is promising, as Abba probably has less explicitly male connotations for English speakers, even though it is masculine in Hebrew.

In the final stages of preparing this thesis I heard that the soon to be released Uniting in Worship II, a worship resource manual designed for Uniting Church congregations, will contain one service with female images of God, though this was highly controversial decision[775] leading to the resignation of several committee members. It has, then, become official Uniting Church policy to affirm, though not to require, the use of female images of God alongside traditional males ones.

So we can move beyond andropocentrism and still be Christian. Can we go further and escape our anthropocentrism?

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[773] Ibid.
[774] Pat Baker, "Inclusive Language and the Trinity- Extracts," *Trinity Occasional Papers* 9, no. 1 (1990): p. 38.
[775] Assembly Standing Committee unconfirmed minutes of meeting held July 2004.

I believe that the formulation I first used in a sermon on June 18th, 2000 is a useful attempt. It drew on a lecture in 1992 by Arthur Jackson and a sermon in about 1995 by Andrew Dutney. They spoke of the doctrine of the Trinity as the early church's experience that the God they knew of as creator of all that is, they also met in Jesus of Nazareth, who lived amongst them. Not only that, they continued to experience Jesus of Nazareth amongst themselves after the resurrection. In order to acknowledge this insight, in the light of the discussion above, I have begun to formulate the Trinity as the God who **"***is beyond us, became one of us, and remains within and amongst us*.[776]"

This formulation is similar to Dizdar's, "God beyond-all, God-with-us, and God-within-all," except that his label God-with-us does not highlight a core Christian affirmation that in Christ God was not just with us, but actually became one of us[777]. Dizdar's formulation is valid, it simply doesn't go as far as it could. Dutney uses the phrase, "God beyond us, God against us, God within us,[778]" but the middle part makes it clear that this is not directly a Trinitarian construction so much as an affirmation of three experiences of God.

My formulation, I believe, provides a valid Trinitarian foundation which is at least potentially consonant with the scientific story. In escaping not only androcentrism but anthropocentrism; it addresses the Shepard's criticism that expanding the image of God to include women only slightly widens humanity's narcissistic religious mirror[779],

> "All the humanized deities were insufficient substitutes for a zoological theriophany… the dead end of making gods in human form.[780]"

How, then, do we include this zoological theriophany in the image of the Trinitarian God which Christians worship? Two approaches suggest themselves. A predominantly anthropocentric possibility simply expands the image outwards from humans to include at least some other species. A more biocentric alternative would recentre the image to life itself, with humans included in the image alongside of other species.

9.1.2.3 Broadening the anthropocentric image: humans at the pinnacle

I will start with the more anthropocentric approach, which admits that whatever the image of God is, at least some other animals reflect it, though to a lesser degree than humans. We would thus be the exemplar of the image of God, and the anthropocentric claims about God's image would need only slight modification. We would remain very much at the pinnacle, but we would need to expand the circle somewhat. We would admit that we are not the only creature which shows signs of rationality, morality, language, culture, freedom etc, but would emphasise that we do express each of these things far more fully than any other animal we know of.

If Westermann is correct that the image of God is a statement about the ability to relate to God, then Edwards should be arguing for an hierarchical image of God, since he claims that *all creatures* relate directly to God at some level, in that Christians are,

> "…linked in relationships of kinship and community with all other creatures in a global *koinonia* of the Holy Spirit.[781].

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[776] It remains for other things we say about God to highlight Jackson's point that our language about God must preserve the intimate, loving aspect. Of course, this is the case even in the classical formulation, since not everyone who hears "Father" or "Son" thinks of loving intimacy.
[777] The Apostles' Creed carries this strong assumption, with Jesus' birth from the virgin Mary (Owen, ed., *Witness of Faith*, p. 42.) The Nicene Creed explicitly affirms that Jesus was, "made man [sic]" (Owen, ed., *Witness of Faith*, p. 52.)
[778] Andrew Dutney, *Food, Sex and Death- a Personal Account of Christianity* (Melbourne: Uniting Church Press, 1993), p. 82.
[779] Shepard, "On Animal Friends," p. 295.
[780] Ibid, p. 293.
[781] Edwards, *The God of Evolution: A Trinitarian Theology*, p. 98.

To include other creatures in the image of God would, however, place him outside the realm of Catholic dogma. Amongst Protestant theologians there is more freedom to explore a hierarchy in the image of God, indeed the above section would seem to require it. Although an increasing number of theologians do accept that there is no ontological distinction between humans and other animals[782], they tend not to reflect on the implications of this for the conception of the image of God. Langdon Gilkey is one exception,

> "God is only dimly known here, barely perceived and stumblingly described - as is the wonder and mystery of nature through which God is thus dimly known. *As we have seen, nature is an image of God*, a creaturely reality of immense creative power, order, and value, an image of the sacred, and hence a finite reality or value for itself... *Nature is for itself and us the medium through which God's power, life and order are communicated to us* (emphasis mine).[783]"

For Gilkey, 'nature' is *an* image of God, separate from the human image. He then goes on to profoundly diminish his claims for nature, and subordinate it under the human image,

> "... what is known of God in nature represents by no means the centre of the knowledge of the divine for most religious traditions, and certainly not of God for the Christian… The consequence... is that *what I am trying to do here, while important, is not vital to the centre of Christian theology*.[784]"

So Gilkey actually suggests nothing more than the already widely accepted proposition that we see something of God in the processes of nature, though he is one of the very few to use the language, "Image of God" to describe this.

Sallie McFague also explicitly admits that we are not the only creatures made in the image of God[785], and goes on to claim that human sin is our failure to stay in our place and accept our proper limits, to make room for other species[786]. Rather than speak of two images (nature and the human), she seems to envisage a hierarchy within the image of God, which relates directly to a hierarchy of value amongst species, with humans at the top[787].

Process theologians mount a sustained defence of this hierarchy of value. Of all the modern theological systems, process theology is the one most open to affirming a continuity of being between

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[782] Lois Daly, "Ecofeminism, Reverence for Life, and Feminist Theological Ethics," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), Celia Deanne-Drummond, *Biology and Theology Today* (London: SCM, 2001), p. 113, Langdon Gilkey, *Nature, Reality and the Sacred: The Nexus of Science and Religion*, ed. Kevin Sharpe, *Theology and the Sciences* (Minneapolis: Fortress, 1993), p. 188, Thomas Hosinski, "How Does God's Providential Care Extend to Animals?," in *Animals on the Agenda: Questions About Animals for Theology and Ethics*, ed. Andrew Linzey and Dorothy Yamamoto (London: SCM, 1998), p. 138 , Howell, "A God Adequate for Primate Culture.", Johnson, *Women, Earth, and Creator Spirit*, p. 30, Catherine Keller, "The Face of the Deep: Reflections on the Ecology of Process Thought," *The Australasian Journal of Process Thought* 1 (1999), Michollet, "Evolution and Anthropology," p. 81, France Participants in the WCC Annecy Gathering, September 1988, "Liberating Life: A Report to the World Council of Churches," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), p. 277, James Rachels, *Created from Animals: The Moral Implications of Darwinism* (Oxford: Oxford University Press, 1990), p. 165, Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*, p. 250.

[783] Langdon Gilkey, "The God of Nature," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy, and Arthur Peacocke (Vatican City State: Vatican Observatory Publications, 1995), p. 220. This is a near verbatim repeat of the conclusion to his earlier book (Gilkey, *Nature, Reality and the Sacred*, p. 203.)

[784] Gilkey, "The God of Nature," pp. 212-13.

[785] Sallie McFague, *The Body of God : An Ecological Theology* (Minneapolis, London: Augsburg Fortress, SCM, 1993), p. 113.

[786] Ibid.

[787] Seen, for example, when she contrasts the needs of a hungry human child with that of 'animals', and automatically prioritises the former (Ibid, p. 117.)

humans and other organisms[788]. Humans are no longer seen to be of, "… infinitely more value than the whole Earth.[789]" As Nancy Howell, a process theologian puts it,

> "Whitehead extends the term 'person' to include most animals. Humans, animals, and vegetables are societies of events or experiences, in Whitehead's view. Living bodies possess an internal organizer that coordinates the events and relationships that make up individuals. *A "person" is one whose experiences are so organized that they form a coherent and recognizable being. Humans and vertebrates in particular are described by Whitehead's notion of person.*[790]"

What defines a person, then, is not an ontological category, but an assessment of how coherent its comprehension of experience is. Birch calls this the person's *richness of experience*. The richer a life form's experience, the more a person it is, and the more intrinsic worth it has.

Since human beings are thought to possess the greatest capacity for richness of experience, they exist at the top of the hierarchy of intrinsic worth. For example, Barbour argues that because a mosquito has less richness of experience than a human, it is of less *intrinsic value*[791]. Process theologians go on to contrast intrinsic worth with *instrumental value*, or the value of an organism *to others*,

> "… a human being is more valuable than a mosquito to itself, to other beings, and to God[792]."

The first claim is surely true: most humans value their own lives more than they do the life of a mosquito. The second claim is surely *incorrect*. To a frog, for example, a mosquito is of much more instrumental value than a human being. Indeed, humans have a *negative* value to a frog, both as predators and habitat destroyers. They have a negative value to *many* species for the same reasons, as the many litanies of ecological destruction testify. I will assess the third claim, that each human has more value to God than other life forms do, later in the thesis[793].

The hierarchical use of intrinsic worth in process theology leads to problems when it engages with other theological discourses, where intrinsic value implies equality. McDaniel illustrates the problems which arise when both senses are combined uncritically. He refers approvingly to the World Council of Churches, Church and Society Working Committee, which talks about intrinsic value as something *absolute*, a claim that something is loved by God[794]. This reflects a core Christian affirmation that God loves the world, declaring it good. Later in his paper, however, he uses intrinsic value in the hierarchical process sense,

> "The greater a living organism's capacity for sentience, exemplified in part by the complexity of its nervous system, the greater its intrinsic value.[795]"

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[788] Indeed, process theology goes beyond life to affirm a basic continuity between all matter.
[789] Wesley, *Collected Sermons of John Wesley from the 1872 Edition*. Previously cited on page 11.
[790] Howell, "A God Adequate for Primate Culture," paragraph 33.
[791] Barbour, *Nature, Human Nature, and God*, p. 131. See also Birch, "The Liberation of Nature," p. 9. This is developed in Birch and Cobb, *The Liberation of Life : From the Cell to the Community*. Birch distinguishes his approach from that of Singer, whom he says focuses only on the capacity to suffer of an animal. Their positions are actually extremely similar, see Peter Singer, *Animal Liberation: A New Ethics for Our Treatment of Animals*, 2nd ed. (London: Thorsons, 1991), p. 8. Birch's explanation of intrinsic and instrumental worth remains unchanged through until 2000, where he explicitly uses the principle to suggest differences in intrinsic worth amongst humans based on their richness of experience, again much like Singer (Birch, "Environmental Ethics in Process Thought," pp. 3-5. In this recent article Birch acknowledges that both his and Singer's systems have very similar outcomes.)
[792] Barbour, *Nature, Human Nature, and God*, p. 131.
[793] Chapter 9.5
[794] Jay B. McDaniel, "Revisioning God and the Self: Lessons from Buddhism," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), p. 230.
[795] Ibid, p. 231.

Combining the two approaches we conclude that the more intelligent something is, the more intrinsic value it has, and therefore the more God loves it. We are led logically, though McDaniel does not appear to recognise this, to conclude that since not all beings are intellectually equal, they are not all equally loved by God. Tony Kelly, who uses process theology and Teilhard de Chardin as his basic framework, states this explicitly. He claims that God created the universe to be completely free of divine control because only something which is truly free is worthy of love,

> "A *mere creature* is no fit subject of God's love. However a self-created [self-conscious] entity could be an appropriate subject of God's love, if it was otherwise similar to God.[796]"

Few ecotheologians, indeed few theologians, would be comfortable with such an explicit rejection of the fitness of creation to be loved, or even instituting a hierarchy of love. Many more would recoil from the obvious implication that, since not all *humans* have similar intellectual capacity, or richness of experience, not all humans are equally loved by God.

As Singer[797] and Tom Regan[798] point out, human babies have inferior capabilities on any scale to adults of some other species. Some humans with profound intellectual disabilities will be permanently inferior to some animals on any scale of intellectual or emotional maturity[799]. Since there is no ontological gap between humans and other animals to fall back on, a hierarchical image of God will necessarily create a hierarchy amongst humans, saying that some humans reflect the image of God less than others, and that some reflect the image of God less than animals of other species.

Carol Christ criticises hierarchies of intellect or consciousness at the level of whole cultures. She points out that theologies which elevate intellect and self-reflection can unwittingly imply that cultures which do not value such things are less valuable[800], or less human. At the recent *Christianity after Darwin* conference in Adelaide Tony Kelly appeared to do just that. He claimed that Australian Aboriginal culture was pre-moral, as indeed was all human culture before 1000BC, because their intellect was less developed than western culture[801]. Yet, he added, only humans who had developed truly moral culture expressed the kind of freedom God sought; a self-creating creature which was finally worthy of being loved. Only the people who represent this final emergent stage are free to relate properly to God, or as we would say to express the image of God fully.

So, at both the individual and cultural level, retaining the traditional evidences of the image of God, and thus creating a hierarchical image, leads towards affirmations which are anathema to contemporary theology. Whilst the church *has* argued in the past that all humans are not equal, and do not equally bear the image of God[802], the principle of human equality has been espoused by almost every Western theologian for the last three centuries[803]. This includes both Catholic and Protestant theologians, and both link equality to the possession of the image of God. Barth typifies the Protestant project,

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[796] Tony Kelly, "An Emergent Christology" (paper presented at the Christianity After Darwin: Doing Theology in an Evolutionary Context, Adelaide, Australia, September 2004).
[797] Singer, *Animal Liberation*, pp. 16, 239-40.
[798] Tom Regan, "Christianity and Animal Rights: The Challenge and Promise," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), p. 79.
[799] Singer, *Animal Liberation*, pp. 16, 239.
[800] Carol Christ, "Rethinking Theology and Nature," in *Weaving the Visions*, ed. Judith Plaskow and Carol Christ (San Francisco: Harper & Row, 1989), p. 322.
[801] Kelly, "An Emergent Christology". These comments were made by way of example and do not feature in the text. In response to sustained audience questioning he described morality as being the ability to do the right thing, even if the law proscribes it.
[802] Ruether, "*Imago Dei*, Christian Tradition and Feminist Hermeneutics," pp. 267-70.
[803] Rachels, *Created from Animals*, p. 175.

> "Man [sic] is not elected to intercourse with God because, by virtue of his humanity, *he deserved such preference*. He is elected through God's grace alone[804]… It is a distinction of every being which bears the human countenance… The acknowledgment of this distinction has nothing to do with an optimistic judgment of man [sic]. It is due him [sic] because he [sic] is the being whom God willed to exalt as His covenant partner, not otherwise.[805]"

The equality of all people, as bearers of the image of God, has been unanimously affirmed by the councils of the Uniting Church[806]. To call this into question, which we must do if it is hierarchical, since there is no ontological gap between humans and other animals, is a last resort.

Gregory Peterson to a large extent moves us beyond this approach. He refers to Gilkey's work, but has a more positive assessment of its importance than Gilkey himself, correctly identifying the fact that the reinterpretation of the image of God has enormous consequences for theology, being a core Christian concept[807]. He rejects Gilkey's two images approach, instead locating humanity within the one image of God which we see in nature, in what he admits is a tentative reinterpretation. He points out that consciousness is a very difficult concept to define, regardless of the model of consciousness being used, and therefore does not believe that simply expanding the image of God to include conscious or self conscious creatures is sufficient[808].

He initially appears to move away from McFague and the process theologians when he proposes that the locus be moved from human beings (and our consciousness) to nature itself. All of life is the image of God. Yet he still allows for human pre-eminence, based on our consciousness, which has allowed us to *become* more the image of God through our taking on the responsibility of being caretakers for the planet. So we are pre-eminently, perhaps especially, the image of God, based not on ontological difference, but stewardship[809]. Peterson then calls his own line of reasoning into question, asking,

> "Isn't it the height of human arrogance to assume that because we, in our mature adult stage, are a bit more intelligent than other creatures, we are more like God?[810]"

He concludes that, "… the old strategy of emphasizing the difference between human beings and animals… is no longer viable." Yet this, on my reading, is what he does when he allows that we are pre-eminently the image of God, for surely this implies that we are more like God. Peterson seems to acknowledge this tension without attempting to resolve it, his aim after all is to speculate so as to stimulate discussion rather than drawn firm conclusions. Having rejected the hierarchical notions he entertains, I will pursue his line of thinking in which the image of God is relocated to life itself (he says nature). What, in other words, are the possibilities of a *bio*centric conception of the image of God?

9.1.2.4 The biocentric image of God

Ivone Gebara calls us beyond the anthropomorphic God,

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[804] Barth, "The Humanity of God," p. 53.
[805] Ibid, p. 52.
[806] Gospel and Gender, *Made in the Image of God,* Uniting Aboriginal and Islander Christian Congress, *Manifesto* [internet] (May 2003 [accessed 5 October 2004]), available from http://www.covenanting.unitinged.org.au/index.cgi?tid=17, UnitingJustice, Australian Catholic Social Justice Council, and Anglican Social Responsibilities Network, *Subverting Racism: Social Justice Sunday 2003* [internet] (2003 [accessed 5 October 2004]), available from http://nat.uca.org.au/unitingjustice/resources/socialjusticesunday/2003/.
[807] Peterson, "The Evolution of Consciousness and the Theology of Nature," p. 299.
[808] Ibid.
[809] Ibid: p. 299-301.
[810] Ibid: p. 302.

> "By analogy, God is a human person, the sap of human life, but also the sap of life in trees, in flowers, in animals, and in all that exists. By analogy too, God is man, woman, breeze, hurricane, tenderness, jealousy, compassion, mercy: Mystery.[811]"

This sounds non-hierarchical, and indeed she explicitly demolishes any central apex in life, "… there is no single pivotal reality on which we all depend; rather all depends on all. The centre is in all and in everything.[812]"

This radical revisioning of the image of God stands in stark contrast to the traditional image, even as it slowly expanded to include women, and then other creatures in a subordinate place. Gebara dares to revision God so completely because she accepts that thoughts about God have never been static. She accepts the anthropologists' claim that human images of God have evolved[813] over time; that the idea of a supreme Being is the result of a slow evolutionary process, one of many hypotheses[814]. The supreme Being, she acknowledges, was, "… clearly fashioned in the image and likeness of the human personality.[815]" Nonetheless, because this image has evolved, "… we can gradually prepare ourselves to consider other images of ourselves and of the mysterious reality we call God[816]."

Stephen Dick agrees that the idea of a supernatural God is,

> "… of course, a historical artefact, a product of the evolution of human thought. It was the great innovation of the Judaic tradition, which began about four thousand years ago… Although it has proven a resilient and flexible concept, a supernatural God is no different from other powerful ideas developed throughout history, in the sense that it is useful, persistent, and subject to change.[817]"

Kwok Pui-Lan points out that the image of God now so common and unquestioned amongst Christians strongly reflects the western culture it evolved in. The kind of image proposed by Gebara is no shock for many Asian theologians,

> "Western anthropocentrism thinks of God in terms of the image of human beings: God is king, father, judge and warrior. God is the Lord of history, intervening in human events. *On the contrary*, Oriental people and Indigenous people who are tied to the soil imagine the divine, the Tao, as silent and non-intrusive… earth as mother who is sustaining and life-affirming (emphasis mine).[818]"

I have not yet, however, seen Kwok Pui-Lan use any explicit metaphors, apart from Tao, to convey what she is proposing. To my western mind, there is a tension between the very passive, "silent and non-intrusive" God, and the actively, "sustaining and life affirming" one[819]. How, if one is silent, can one affirm anything? And how can something be sustained unless there is some intrusion on the part of the sustainer?

What is clear is that, "A shift from anthropocentrism to bio-centrism necessitates a change in our way of thinking and speaking about God.[820]" More explicitly, "To develop a feminist ecological model for Christology, we have to… dare to use non-human metaphors…[821]"

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[811] Ivone Gebara, *Longing for Running Water: Ecofeminism and Liberation* (Minneapolis: Fortress, 1999), p. 116.
[812] Ibid, p. 115.
[813] That is, changed in response to the environment in which the human societies lived, not improved.
[814] Gebara, *Longing for Running Water*, pp. 141-42.
[815] Ibid, p. 113.
[816] Ibid, p. 107.
[817] Dick, "Cosmotheology," p. 203.
[818] Kwok Pui-Lan, "Ecology and the Recycling of Christianity," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 110.
[819] This tension also exists in process theology, which also fails to adequately resolve it, as I shall argue later.
[820] Pui-Lan, "Ecology and the Recycling of Christianity," p. 110.

I have already mentioned that such metaphors were the dominant ones, if not the only ones, in pre-agricultural societies. Catherine Keller points out that they persisted, as very much a minority voice, even in cultures overrun with female and then male images of God. In her exploration of the book of Job, she notes that, after the voice from the whirlwind, Job says to God, "now my eyes see you." What Job has *actually* "seen" in the whirlwind, however, is not some anthropomorphic God. Rather, Job saw, "… only the creatures. To 'see' God *is* to see the creation.[822]"

So for these thinkers the image of God is blown wide open. *Biological Life* is the image of the living, but non-biological God. It is the juxtaposition of the billions of year's long stream with the current web - the venous cross section- to which we need to look for the image of God. Peterson is the only theologian I found who endorses this stream-like view of the image of God, and then only implicitly. I have already noted that he affirms nature as the image of God, and to this we can add his proposal for a theologically promising metaphor for the evolution of life as, "… living waters, flowing in many directions and curling around in unique and beautiful patterns.[823]"

In affirming the pulsing flow of life as the image of God, I am not advocating a return to animism. Biocentric theology transcends the reliance on individual animals as totems of the gods. Different individuals do not contain different parts of the image of God - *life* is the image of God[824]. Life as the image of God, rather than *lives*, is consonant with the suggestions from the science story that the boundaries around species and bodies are more fluid than we think. The first anthropocentric proposition is invalidated, not by negation, nor even really by expansion, but by explosion. We look to figure 14, rather than the mirror, to see the image of God.

The kinds of distinctions we make amongst objects and organisms are part of our biological survival tool-kit, which all creatures possess. I propose that God, who is not a biological entity, and thus would not have evolved the same need to discriminate as we have, is able to see and relate directly and primarily to, *life*, the venous cross section of all that has been and will be. That is, not only is life in the likeness of God rather than the human alone, life relates directly to God, rather than through the human.

This brings to mind the second anthropocentric assumption, that the God-life relationship on Earth is somehow mediated through the God-human relationship. Humans alone have been mandated, since the beginning of creation, to exercise some form of dominion over life on Earth. The link between the image of God and the mandate for dominion is an intimate one. Radford Ruether claims that modern Hebrew scholarship sees the image of God *as* the mandate for dominion[825]. Westermann, who rejects so close a link, still admits that in the text, as well as in later interpretations, "… dominion over the rest of creation is the *consequence* of the image and likeness of God (emphasis mine).[826]"

We might already begin to suspect theologically that if all life bears the image of God; all life would be that which exercises dominion on Earth. How does that fit with the scientific story?

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[821] Kwok Pui-Lan, *Introducing Asian Feminist Theology*, ed. Mary Grey, et al., vol. 4, *Introductions in Feminist Theology* (Sheffield: Sheffield Academic, 2000), p. 91.
[822] Catherine Keller, *Face of the Deep: A Theology of Becoming* (London: Routledge, 2003), p. 139.
[823] Gregory Peterson, "Being Conscious of Marc Bekoff: Thinking of Animal Self-Consciousness," *Zygon* 38, no. 2 (2003): pp. 254-55. He only mentions this metaphor in a concluding sentence and has not yet developed it in any published material.
[824] Process theology rejects any ontological difference even between what we commonly call life and non-life, so that the image of God would then be matter itself. Whatever the strengths of that approach, it is sufficient to make my point to talk of life as the image of God, and will prove less clumsy in sections to come.
[825] Ruether, "*Imago Dei*, Christian Tradition and Feminist Hermeneutics," p. 272.
[826] Westermann, *Genesis 1-11: A Commentary*, pp. 153-55.

9.2 *H. sapiens* as divinely appointed stewards of creation

9.2.1 Summary of the scientific data

The idea that humans could ever exercise dominion over the entire *universe*[827], with its seventy thousand million million million solar systems, is ridiculous. The more humble claim in Genesis and most ecotheology is that we are granted dominion over life on *Earth*. Even this is implausible in the science story.

We have seen that human beings have been present on Earth for only a minute fraction of its history, and will probably be here for only a minute fraction of its future. Life evolved and interacted for billions of years without us, and will continue to do so. The idea that we were appointed to exercise stewardship over creation from its beginning to its end is historically impossible[828].

According to the science story, if anything has dominion over life on Earth, it is the microbes. Nothing else would survive long without them. They were the first organisms, and they will be the last. They make up far more of the biomass of life on Earth than humans, about half of the total biomass of Earth at present[829]. It is the microbes which created, and drive, the life systems of Earth[830],

> "Bacteria, never having gone extinct, continue to protect us as their populations grow prodigiously. They maintain soils for us and purify waters[831]."

Life on Earth is dominated by unconscious organisms, selected for their ability to consume resources. Of secondary importance ecologically are species like ours, adapted to live off microbial and plant waste products like oxygen. Consciousness and rational thought play a miniscule role in shaping the development of life on Earth.

All organisms shape their environment, and the more complex their nervous system the more deliberately they do so. Many use technology to assist them, especially birds and mammals, and amongst the latter especially primates. Humans, with the most developed nervous system we are aware of, have produced technologies with astounding resource manipulation abilities compared to other primates, to the point where a large proportion of technology is used to manipulate the environment in ways which have no biological survival value. Likewise their ability to reflect on the consequences of each manipulation, and respond accordingly, is greatly developed, though rational reflection certainly does not guide all human decisions. Since not all humans have access to the same technologies, it is relatively few who have such an enormous impact on life on Earth compared to their requirement for biological survival.

9.2.2 Theological responses

The majority of theologians grappling with the relationship between humans and the rest of creation have failed to take the above data seriously. This is the only explanation for the continued ubiquity of the distinctly anthropocentric metaphors like humans as stewards and/or priests of creation[832], charged by God with responsibility for guiding the development of life on the planet.

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[827] As we saw for example in Uniting Church in Australia, "Minutes of the 1985 Assembly", p. 160 (appendix 1).
[828] Some might argue that, from the beginning of creation, God foresaw and foreordained that *H. sapiens* would arise at a particular moment in world history to exercise stewardship. Whatever the merits or usefulness of such an idea, it is very different from the traditionally accepted view that we *H. sapiens* has been around for the entire history of life on Earth. It also leaves Earth without our stewardship for 99.99…% of its history and future, thus making human stewardship a far more humble project than traditionally assumed.
[829] Mayr, *What Evolution Is*, p. 48.
[830] Margulis and Lovelock, "Gaia and Geognsy," p. 8. See also Margulis and Sagan, *What Is Life?* , p. 48-52.
[831] Margulis and Sagan, *What Is Life?* , p. 52.
[832] Hiebert, "The Human Vocation," p. 143.

9.2.2.1 Continued defense of *H. sapiens* as steward or priest

I have already shown that stewardship is the dominant model by which the Uniting Church resources describe the relationship between humans and the rest of creation, even if it started to lose its stranglehold recently. This is a microcosm of the wider theological landscape, where stewardship still holds sway[833], largely because of the preoccupation with the current perceived ecological crisis. The main agenda appears to be to get Christians to do something, and stewardship supports that agenda admirably. It needs to be remembered, however, that even this apparently broad interest in ecotheology remains a minority tradition in Christian theology as a whole, and a small part of the life of worshipping communities. Most Christians, certainly in terms of what they *do*, and possibly even in what they confess, still operate more or less out of a domination model[834].

The widespread attempt to move people away from domination is typified in Dieter Hessel's appeal,

> "Our *primary vocation* is to care for creation with love that seeks justice. Love does not insist on its own way, *the normative human role* is that of *earth keeper or household manager* to be exercised with humility (emphasis mine). [835]"

It will come as no surprise that Orthodox and Roman Catholic theologians, because of their prior commitment to maintain the ontological distinctiveness of human beings, promote anthropocentric images of humans as stewards or priests of creation.

To take Orthodoxy as an example, we see the claims about humanity remaining unchanged from the 1990s to the present. Gennadios Limouris, introducing a collection of Orthodox contributions to the WCC JPIC project in 1990, claimed that, "The human being is both king and priest; he/she has been given by God the responsibility to rule, but that responsibility goes with the priestly role of prayer and meditation.[836]"

In his 2002 review of Orthodox teaching on the environment, Tamara Grdzelidze recalls the unanimous teaching of the Orthodox fathers that the human being is the crown of creation, a bridge between heaven and Earth, put here to reign over Earth's creatures. Not only are we to act ecologically responsibly, but,

> "The task of humankind is to go further then the mere preservation of creation; it is to purify creation, and elevate it to the level of its creator.[837]"

So the Orthodox expand humanity's role from a fairly technological sounding stewardship role, to a royal priestly role. Far from questioning anthropocentrism, they elevate it.

Despite all that the ecofeminists call into question about Roman Catholicism and the Orthodox church, the strong desire for practical outcomes prompts some to uncritically adopt very similar stewardship type models, because of their usefulness. Catharina Halkes, for example, claims that we are here to rule Earth for God, as his representatives, "All is transferred to us in order that we may protect it, may preserve and keep watch over the garden, may see to it that justice is done to everything and everyone[838]."

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[833] Santmire, *Nature Reborn : The Ecological and Cosmic Promise of Christian Theology*, p. 7.
[834] Dieter T. Hessel and Rosemary Radford Ruether, "Introduction: Current Thought on Christianity and Ecology," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. xxxviii.
[835] Dieter T. Hessel, "Now That Animals Can Be Genetically Engineered: Biotechnology in Theological-Ethical Perspective," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 289.
[836] Gennadios Limouris, ed., *Justice, Peace and the Integrity of Creation : Insights from Orthodoxy* (Geneva: World Council of Churches, 1990), p. x.
[837] Grdzelidze, "Creation and Ecology," p. 212.
[838] Catharina J. M. Halkes, *New Creation : Christian Feminism and the Renewal of the Earth* (London: SPCK, 1991), p. 132.

Increasingly, however, theologians have grown uncomfortable with these metaphors, based partly on the inability to reconcile them with the massive sweep of the evolutionary story of life.

9.2.2.2 From steward to co-creator

Clare Palmer summarises well the critique of stewardship metaphors, so I quote her at some length,

> "One particular danger of such a search [for new language about our relationship to the rest of creation] is the tendency to latch on to already existing, familiar concepts which seem at first glance to solve the problem. In fact, these terms may act as blinkers which block out deeper consideration of the question at issue. It is this which I am suggesting has happened with the widespread adoption of 'stewardship' to express the relation of humans with the rest of the natural world.[839]"
>
> "In the light of evolution, the idea of human metaphysical 'set-apartness' becomes impossible to justify. However, the concept of stewardship continues to support this set-apartness.[840]"
>
> "The contention that man [sic] is needed to look after the earth stems from a preevolutionary understanding of nature. It is perhaps influenced by the idea that nature is 'fallen' and imperfect, requiring human activity to perfect it. In the light of evolutionary science, the idea that earth 'needs to be managed' by humans is obviously a nonsense, although still maintained by some theologians… If humanity should become extinct, as all species ultimately seem to do, then life on earth will continue to flourish…[841]"

Palmer, unfortunately, does not go on to offer an alternative language to describe how humans and the rest of creation are related. This tendency to identify conceptual problems without offering much of a solution is widespread in ecotheology. This need not be surprising, since the endeavour is still relatively new. For example, at around the same time Palmer wrote, David Hallman edited a major work on ecotheology, in which he claimed that,

> "We are in the early stages of a profound conceptual shift in theology that will move us far beyond stewardship theology as a response to human exploitation of God's creation... our approach is still a management model in which we humans think we know best. By breaking open that conceptual prison, feminist theology and insights from the traditions of Indigenous peoples are both critically important groundings for the emerging ecotheology, as the articles in those chapters demonstrate.[842]"

A sign of the "early stages" is that some of the articles in Palmer's collection still explicitly advocated the stewardship paradigm. As the following references will show, ten years on from Hallman we are still very much in the early stages of this profound shift, especially regarding our ability to offer new language which incorporates the understandings of evolutionary biology into a desire to see Christians adopt a more life affirming faith.

As recently as 2000 Santmire found it necessary to argue that we should retire the words dominion and stewardship, "… for the foreseeable future… These terms still carry too much baggage from the anthropocentric and indeed androcentric theology of the past…[843]" He believes that we need to escape

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[839] Clare Palmer, "Stewardship: A Case Study in Environmental Ethics," in *The Earth Beneath : A Critical Guide to Green Theology*, ed. Ian Ball, et al. (London: Spck, 1992), p. 67.
[840] Ibid, pp. 78-79.
[841] Ibid, p. 79.
[842] David G. Hallman, "Beyond "North/South" Dialogue," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 6.
[843] Santmire, *Nature Reborn : The Ecological and Cosmic Promise of Christian Theology*, p. 120.

"evolutionary anthropocentrism,[844]" proposing that we are called to *cooperate* with nature and *care* for nature.[845] This sounds anthropocentric all over again, but the sorts of care and cooperation he describes are fairly limited in scope.

For example we are not to care for nature as a whole, as if we were its supervisors, but to minimise our ecological impact on other species. It is a little unclear, then, how central *H. sapiens* is to the scheme of things in Santmire's thought. He clearly believes that humans are fundamentally different from other life forms. According to Santmire, we can only have I-Ens relationships with nature, not I-Thou ones[846]. I-Ens is Santmire's term for relationships between humans and beings which are not persons, but not simply "Its" either. He believes that I-Ens overcomes Martin Buber's idiosyncrasies, which arise from his reservations about using I-Thou to characterise the human-non human relationships[847].

Yet Santmire overstates the problem. For example, Santmire claims that Buber admits to having, "… no unified answer to this question," of the character of the nature of the reciprocity of things in nature to us. Buber actually said, however, that, "… no *sweeping* answer can be given to this question. (Walter Kaufman's translation)" and then goes on to give a two part answer in terms of threshold and pre threshold I-Thou relationships[848]. Personally, I think Santmire's addition is unnecessary, since as he admits the thou/it/ens categories are fluid anyway, as explained by Kaufman in his prologue to his translation of Buber[849].

As part of his I-Ens framework, Santmire calls humans to cooperation with the rest of creation, which brings to mind the work of Philip Hefner. Hefner explicitly rejects stewardship as a model, proposing instead that humans are the created co-creator,

> "Human beings are God's created co-creators whose purpose is to be the agency, acting in freedom, *to birth the future* that is most wholesome for the nature that has birthed us - the nature that is not only our own genetic heritage, but also the entire human community and the evolutionary and ecological reality in which and to which we belong. Exercising this agency is said to be God's will for humans[850]"

This book won the 1993 Templeton prize in the field of science and natural theology, and became widely influential, being used explicitly, to name a few examples, by Michele Grimbaldeston[851], Elizabeth Johnson[852], Limouris[853], McFague[854], Peacocke[855], Peters[856] and Dorothy Soelle[857].

It is not at all clear, however, that being a co-creator is much different from being a steward. Hefner explicitly retains humans at the centre of the story of God and creation. Birthing the future sounds an even grander task than simply exercising stewardship. We have not, then, moved beyond deep anthropocentrism, and Palmer's criticism of stewardship seems just as applicable to co-creation.

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[844] Ibid, p. 44.
[845] Ibid, pp. 120-24.
[846] Ibid, pp. 66-72.
[847] Ibid, p. 68.
[848] Martin Buber, *I and Thou*, trans. Walter Kaufman, 3rd ed. (Edinburgh: T. & T. Clarke, 1975), pp. 172-73.
[849] Ibid, pp. 16-17.
[850] Philip J. Hefner, *The Human Factor : Evolution, Culture, and Religion*, *Theology and the Sciences.* (Minneapolis, Minn.: Fortress Press, 1993), p. 264.
[851] Michele Grimbaldeston, "Sophia Renewing Earth: Speaking About God in Wisdom Categories," *Pacific Journal of Theology and Science* 2, no. 1 (2001): p. 21.
[852] Johnson, *Women, Earth, and Creator Spirit*, p. 63.
[853] Limouris, ed., *Justice, Peace and the Integrity of Creation : Insights from Orthodoxy*, p. x.
[854] Sallie McFague, *Models of God : Theology for an Ecological Nuclear Age* (London: SCM, 1987), p. 13.
[855] Peacocke, *God and the New Biology*, p. 106.
[856] Ted Peters, *Playing God? : Genetic Determinism and Human Freedom*, Second ed. (New York: Routledge, 2003), pp. 16-20. He also seems to refer to Hefner favourably in other works (Peters, *Science, Theology and Ethics*, p. 237, Peters, "Theology and Science: Where Are We?," p. 65.)
[857] Cited in Gregory Brett, "A Timely Reminder: Humanity and Ecology in the Light of Christian Hope," in *Earth Revealing, Earth Healing: Ecology and Christian Theology.* (Minnesota: Liturgical Press, 2001).

9.2.2.3 From co-creator to humble servant

The same could be said of various efforts to recast humans as the humble servants of creation, rather than its lords. This is seen in the work of Habel[858] and Hiebert[859], who point out that the call to dominion in Genesis 1 is very different from the call to till and keep (which Habel translates, "serve and preserve") the garden in Genesis 2. They are absolutely correct. Yet they overstate the non manipulative nature of the second image, that of protective gardener. The image still assumes that agriculture is the good, divinely given order of things, rather than an evolved trait with significant ecological consequences, and as we have seen, theological ones also. The idea that humans are here to guard and protect the Earth is certainly nicer than that we are here to tread down and dominate, but it is not any truer for that.

Linzey, who engages with animal rights more than evolutionary biology, calls us to reject our humanocentric prejudices[860] and become the servant species[861]. Yet his own humanocentrism is seen in that he imagines that we alone could exercise this servanthood, or that we would know what is best for other creatures. This intuitively seems to be truer the more we consider the action of some humans which directly lead to habitat loss, or pain and suffering of animals, in experiments for example. As such, Linzey's call to reconsider those actions, and even actively work against those who do not, is helpful. But to talk generally, in an evolutionary context, about humans as servants of the rest of life does not really move us beyond the deep anthropocentric assumptions more commonly expressed through the stewardship paradigm.

9.2.2.4 Radical reformulation of the role of the human

By far the most popular metaphor used in the attempt to push beyond anthropocentrism is the ecologists' metaphor of life as a web of relationships[862]. The metaphor has been equally powerful in secular environmentalism[863]. The model has greatest currency amongst those who reject unique human stewardship or co-creation[864]. Carol Christ is typical when she calls us to recognise our, "… profound connection with all beings in the web of life[865]," not just ecologically, but ontologically. She goes so far as to claim that we need,

> "… to know that we are no more valuable to the life of the universe than a field flowering in the colour purple, than rivers flowing, than a crab picking its way across the sand - and no less.[866]"

Yet even those who promote humans as stewards or servants or co-creators, whether divinely preordained or as something we have evolved into, occasionally use the web metaphor to describe the world over or in which we must exercise our unique role[867]. They call us, for example, to recognise

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[858] See Habel's comments on Genesis 1 and 2 in Rainbow Spirit Elders, *Rainbow Spirit Theology : Towards an Australian Aboriginal Theology*, p. 79. See also Normal C Habel, *Resource Manual for a Season of Creation* (unpublished draft, 2004), liturgy cycle A, commitment. This is reiterated and expanded in the online Bible Studies which were created to supplement the Season of Creation worship materials (Normal C Habel, *Bible Studies on the Readings for a Season of Creation (Cycle A)* [.pdf file] (2004 [accessed 3 September 2004]), available from http://victas.uca.org.au/creation.)

[859] Westermann, *Genesis 1-11: A Commentary*.

[860] Linzey, "Introduction: Is Christianity Irredeemably Speciesist?," p. xvii.

[861] Andrew Linzey, *Animal Theology* (1995), p. 57.

[862] For example Zimmer, *Evolution*, p. 190.

[863] Worster, *American Environmentalism; the Formative Period, 1860-1915*, p. 9.

[864] For example Sallie McFague, "Imaging a Theology of Nature: The World as God's Body," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), p. 202, Pui-Lan, *Introducing Asian Feminist Theology*, p. 93, Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*, p. 1.

[865] Christ, "Rethinking Theology and Nature," p. 314.

[866] Ibid, p. 321.

[867] Barbour, *Nature, Human Nature, and God*, pp. 37-55, Christine Burke, "Globalization and Ecology," in *Earth Revealing, Earth Healing: Ecology and Christian Theology.* (Minnesota: Liturgical Press, 2001), p. 40, Robert G.

"our intrinsic communion with this web of life.[868]" Even Edwards, who proclaims the ontological distinctiveness of *H. sapiens*, uses the web of life concept to argue that humans have a relationship of kinship and community with all life in the, "global *koinonia* of the Holy Spirit.[869]"

The ease of the metaphor's adoption by people from such different theological world views should give us pause. Its wide adoption is possible because the metaphor itself is a grossly impoverished picture of the complex relationships occurring between organisms and their genes at any moment in time[870]. It also fails to convey the dynamic nature of the evolution of life through history, and falsely implies the action of an external, conscious agent in its creation. Its simple, static, and designed allusions make it easily adoptable by traditional anthropocentric theology[871]. Yet none of the more biocentric theologians who use the metaphor have reflected long enough on its implications to be driven to critique, let alone reject it. Repeatedly they pass over deeper theological analysis in their rush to expound the ethical implications of the web's apparent unravelling at our hands.

Certainly, however, they are not completely constrained by the web metaphor either. Even though they do not develop alternative, more evolutionary compatible models, they do incorporate evolutionary history into their work. Radford Ruether argues that we could not have been put here as stewards,

> "We were not created to dominate and rule the earth, for it governed itself well and better for millions of years when we did not exist or existed as nondominant mammals… Stewardship is not a primal command, but an *ex post facto* effort of dominant males to correct over abuse and become better managers of what they have assumed to be their patrimony, namely, ownership of the rest of the world.[872]"

She points out that even after we did evolve, we were not a dominant species until a few hundred years ago[873]. McFague has a similar position, based on the ecological insight that complex life forms like us are completely dependent for survival on simpler ones, but not vice-versa[874]. Microbes steward us. Celia Deanne-Drummond makes a similar point about prokaryotes[875], but also emphasises that the power of life to regulate conditions on Earth is not absolute - many external factors come into play. Stewardship, then, even by all of life, is a limited affair[876].

Gebara accepts that other organisms exercise not only dominion but also the creativity which dominion requires. She admits that the creativity of an orange seed, "is surely not the same as human creativity," but claims that it, "… clearly participates in the ongoing and awesome creativity of the universe.[877]" To this we could add countless examples of animal creativity and construction which undermine a

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Crawford, *The God/Man/World Triangle : A Dialogue between Science and Religion*, 1st pbk. , with minor corr. ed. (Basingstoke: Macmillan, 2000), pp. 58, 64, 100, Johnson, *Women, Earth, and Creator Spirit*, p. 38, 63, Gordon D Kaufman, *Theology for a Nuclear Age* (Manchester: Manchester University Press, 1985), p. 35, Participants in the WCC Annecy Gathering, "Liberating Life," p. 276. Others use the concept of the web of life metaphor without naming it as such, eg Lucy Larkin, "The Relationship Quilt: Feminism and the Healing of Nature," in *Earth Revealing, Earth Healing: Ecology and Christian Theology*. (Minnesota: Liturgical Press, 2001).

[868] Burke, "Globalization and Ecology," p. 40.

[869] Edwards, *The God of Evolution: A Trinitarian Theology*, p. 98.

[870] As discussed on page 97

[871] For example Rolston III, who claims that humans alone are in the image of God, placed *over* creation (Holmes Rolston III, "Wildlife and Wildlands: A Christian Perspective," in *After Nature's Revolt : Eco-Justice and Theology*, ed. Dieter T. Hessel (Minneapolis: Fortress Press, 1992), p. 123.) He also believes "pristine" forests to be, "a relic of the way the world was almost forever." (Rolston III, "Wildlife and Wildlands," p. 129.).

[872] Rosemary Radford Ruether, "Ecofeminism: The Challenge to Theology," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. 103.

[873] Ibid, p. 104.

[874] McFague, *The Body of God : An Ecological Theology*, pp. 106, 08.

[875] Deanne-Drummond, *Biology and Theology Today*, p. 151.

[876] Ibid, pp. 154-59.

[877] Gebara, *Longing for Running Water*, p. 141.

human-exclusive understanding of the created co-creator model popularised by Hefner. Chung Hyun Kyung explicitly expands Hefner's metaphor to include all of life, such that, "… human beings become co-creators with God *and nature* (emphasis mine).[878]" Process theology could be used to add weight to this argument, since it sees agency and creativity emerging from matter itself[879].

So it seems that some theologians have accepted the ecological reality of life on Earth, and accepted that all of life exercises dominion. The traditional intimate link between the image of God and dominion is thus preserved, but both have been profoundly expanded.

McFague, however, appears to pull back from this conclusion. She argues that with our evolved power comes responsibility. Far from being plain members of the Earth community,

> "We are decentred as the only subjects of the king and recentred as those *responsible* for both knowing the common creation story and *helping it to flourish*… we have become, like it or not, *the guardians and caretakers of our tiny planet* [880]... It is an awesome vocation, *a far higher status* than being a little lower than the angels, subjects of a divine king, or even the goal of evolutionary history (emphasis mine).[881]"

But is this realistic? Does it have any connection to the evolutionary processes of Earth? It implies that the evolutionary processes which have worked for billions of years are now to be supplanted by *H. sapiens*. What does it mean to help life flourish? To care for it? McFague leaps from a mostly biocentric theology to an anthropocentric ethic, but she offers no convincing basis for doing so. She seems to be driven by the desire to call humans to action, to make them responsible for their deeds and thus the reparation.

Are humans responsible, and for what? It is time to consider the final leg of the anthropocentric stool, the idea that *H. sapiens* is, as a species, culpable for the Fall.

9.3 *H. sapiens* as the agent of the Fall

9.3.1 Summary of the scientific data

For billions of years before humans evolved, organisms passed into and out of existence. For at least hundreds of millions of years they were born, experienced joy, pain, suffering, and died. All the realities of creation which are cited as evidence of a fall from God's original designs for the world precede human existence, and so cannot literally be attributed to human disobedience of divine decree. They are instead inevitable consequences of the evolutionary process. There was never an Adam and Eve who brought ruin on the human race and creation, and in who's sin we share. The scientific story reverses the traditional theological story. In the Genesis story as usually interpreted, humans brought about death and pain. In the science story, pain and death "brought about" humans.

Pain and suffering and death (finitude) are an essential part of the evolutionary process. Finitude may be the result of the deliberate action of beings, but is mostly the result of random events, from base pair mutations to asteroid strikes. It also results from the pursuit by organisms for resources, including each other. The different success rates in obtaining these resources is a driving force in evolution. Even though cooperative alliances may evolve, they are alliances against other resource competitors, and only continue if they promote the survival of the collaborators over others. The evolving web does

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[878] Chung Hyun Kyung, "Ecology, Feminism and African and Asian Spirituality: Towards a Spirituality of Eco-Feminism," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 177.
[879] For example Barbour, *Nature, Human Nature, and God*, p. 37, Charles Birch, "Chance, Purpose and the Order of Nature," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990).
[880] McFague, *The Body of God : An Ecological Theology*, p. 108.
[881] Ibid, p. 201.

not preclude love and joy and moral virtue, indeed they evolved out of it, but it does preclude a view in which life on Earth is envisaged solely as benign, loving, and nurturing.

Human beings have initiated an unprecedented era of extinction and individual death on Earth, but it is not the first. Earth has experienced a recurrent wave of falls in biodiversity. Such falls, including this one, only affect the lives of vertebrates and complex plants to any great extent. Nonetheless, because there were more vertebrate and plant species when humans evolved than ever before, the current extinction event is the biggest in global history[882].

We are the first single species to be the primary agents in such a fall, and the first agent to be able to consciously alter its impact. We are also the first species in which some members have interacted so differently with their environment than others. This is not so much a human initiated fall as a techno-human initiated fall, increasing in severity as technology advanced from fire to stone, metal, and now oil and silicone based tools.

During these mass extinction events the persistence of any one species, or even family or genera is fragile. The existence of all humans, rich and poor, is highly contingent upon the ongoing availability of certain resources, and our ability to defend ourselves against those organisms which constantly try to use us as a resource of their own. The more we spread and turn the world into a homogenised system with us as the dominant consumers, the faster microbes which can exploit us as a resource will evolve and spread amongst us. We have already seen around the world that the survival of humans with limited access to technology is precarious in the face of their growing population, and the technology mediated consumption of their basic resources by humans in other parts of the globe.

In the bigger life picture, we know that the repeated cataclysms, local and global, which have reduced biodiversity, have not completely choked the flow of life. New channels form, just as they do, less spectacularly, every second of the day. What happens after a cataclysm is that the channels flow in new directions, seen for example in the extinction of the dinosaurs and the subsequent colonisation of the planet by mammals. The mechanisms through which life evolves are, the scientists tell us, indifferent to the forms life takes. Unlike the persistence of any one species, the flow of life is not at all fragile, it is highly flexible, and adaptable.

Most ecotheology is a direct response to the perceived human mediated mass extinction event now unfolding. These responses vary widely, largely around the issue of the 'nature' of creation, and whether the finitude which is part of the ecological and evolutionary process is a good to be embraced, or an evil to be overcome.

9.3.2 Theological responses

The Genesis story and the science story are not exactly the same *kind* of stories. Theology and Christian faith are comfortable dealing with mythological stories, knowing that they may claim things which are beyond the ability of science to verify, such as the existence of God in the first place. But we cannot simply try to take the theology of the Genesis mythology and the history of the science story as coequal and independent. We have rejected the path of the "two spheres" approach, in the Uniting Church at least.

We have already seen that the Reformation Witnesses referred to in the *Basis of Union* take for granted the historical reality of a perfect Edenic state from which, through human sin, the world has fallen. Not all Christian theology makes this assumption, but it overwhelmingly *does* assume the *chronology*: first humans, then pain and death. The opposite appears to be true, and theology must engage with this reversal.

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[882] If we go by the actual number of species, and probably organisms affected, but not if we consider percentages, since past extinction events annihilated much greater percentages of species in existence at the time.

This false chronology is clearly assumed in the eco-engaged resources in the Uniting Church, which convey the impression that before humans arrived, Earth was Edenic. I repeat one quote as a reminder,

> "We believe in God… who spun a web of shimmering life, where creatures grew and changed… *Each needing all the others, held in delicate kinship*. We believe in God… *who patiently provides* for each according to their need. *Who blankets the drowsy wintering spider* with warm earth so she may go about her business in the springtime… God calls us as the church to love the earth, to *live humbly* in the web of relationship, to announce the new wilderness (emphasis mine).[883]"

Similarly romantic visions continue to dominate resources produced by the Uniting Church. At the time of writing, the Victorian Synod of the Uniting Church is working on a major project which will transform September into a liturgical season of creation. The draft document describes Earth as a longsuffering, loving parent[884]. The booklet for the preplanning retreat, which I attended, uses the metaphors of Earth as Alive, Celebratory, Parent, Sufferer, Family Tree, and Sanctuary[885]. Discussions during the retreat envisaged Earth solely in positive terms, the only exception being my expressed misgivings about the lack of a "kick your arse" Earth.

This non-creationist Eden is not limited to Uniting Church resources. Mark Wallace's enthusiasm for poetic theology skims heedlessly over ecological reality,

> "… nature is the enfleshment of God's *sustaining love*. As Trinity, God bodies forth divine compassion for all life forms *in the rhythms of the natural order*. The divine Trinity's boundless passion for the integrity of all living things is revealed in God's *preservation of the life-web*... the Father/Mother God's *creation of the biosphere*, the Son's *reconciliation of all beings* to himself, and the Spirit's gift of life to every member of the created order *who relies on her beneficence for daily sustenance* (emphasis mine).[886]"

For Wallace, though I am not sure what he could possibly mean[887], the ecology of organisms is "… best symbolized by Jesus' reconciling work of the cross," and the, "life-web," is, "… a living testimony to the Divine's compassion for all things.[888]"

Many ecotheologians base their Edenic visions on their understanding of Indigenous ways of looking at the world,

> "This cosmic interwovenness [or African and Asian spiritualities] is a wholesome, harmonious and compassionate web of relationships… based on justice: no exploitation, manipulation or oppression, but mutuality, deep respect and delicate balance.[889]"

Whilst this is an understandable reaction to often Earth-negative western spiritualities and theologies, it is not at all clear that Indigenous or pre-industrial societies actually held the sort of romantic notions read into their spiritualities by westerners. Even if they do, they have not prevented Indigenous societies from having a massive ecological impact on their surroundings, as I documented when I

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[883] An affirmation of faith (Assembly Social Responsibility and Justice Committee, "Healing the Earth," p. 31.) Already cited on page 21.
[884] Habel, *Resource Manual for a Season of Creation*, the resource has no page numbers.
[885] Normal C Habel, *The Earth Files: Biblical Sources for Exploring Our Spiritual Connections with Earth (Draft)* (Adelaide: none, 2003). Earth as sufferer related to the human impact on ecology, not the pain which is intrinsic to life.
[886] Mark Wallace, "The Wounded Spirit as the Basis for Hope in an Age of Radical Ecology," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. 57.
[887] Presumably something about life following death.
[888] Wallace, "The Wounded Spirit," p. 57.
[889] Kyung, "Ecology, Feminism and African and Asian Spirituality," p. 177.

considered Fejo's sermon[890]. Birch briefly summarises more evidence to show that Indigenous people's religions did not led them to be superior conservationists[891]. Based on extensive work with New Guinean tribes, Jared Diamond documents that whilst they were often affectionate to domestic animals, torture and maiming of wild animals was commonplace[892]. He concludes,

> "... prehistoric peoples throughout the world are human: neither animals, nor paragons, but human. Like other humans throughout the world, New Guineans kill those animals that their technology permits them to kill. The more susceptible species become depleted or exterminated.[893]"

He also gives a broad analysis of the tendency of all human societies to collapse, because of ecological mismanagement[894]. This seems to be avoided only amongst those humans who live in areas with no easily domesticatable plants or animals, forcing them to maintain a more nomadic lifestyle[895]. One such place is Australia. Even if Australian Aboriginal spiritualities did dictate the way they interacted with the landscape, rather than vice-versa, Veronica Brady correctly warns modern westerners that trying to adopt Aboriginal spirituality is both "delusive and dangerous," a form of sentimentality, an adoption of words and feelings which are not really our own[896].

Rather than seek recourse to apparently more ecologically ideal societies, some authors claim to find in western science *itself* evidence for a pre human Eden, though they provide no data,

> "Neither theology nor ethics has truly fathomed what science presents us as bearers of meaning and power and as cosmic story-tellers in an infinitely magnificent evolution… [producing] the only *oikos* we know and the only one that is fine-tuned for our survival (emphasis mine).[897]"

> "Perspectives from science show us that the earth was designed to be sustainable, how delicately balanced the natural systems are… "Both science and the Bible clearly show that God created a perfect earth.[898]"

Both quotes are at odds with the weight of the scientific stories I outlined in chapter 8, in several respects. Firstly, they ignore the vast fluctuations in the flow of life through evolutionary time - the history of mass extinction events which preceded human evolution. They reflect the simplistic web of life I have already rejected. The only form of scientific support they could claim would be the recent interest in the anthropic principle, a fascination of cosmologists. Because it is mostly a cosmological argument I do not want to go into details. Suffice to say, the above quotes rely on the strong version of the anthropic principle, which is widely discredited. Even then, by claiming that the earth is perfect they are extrapolating well beyond what even the strong version of the anthropic principle states.

The scientific data reveal the exact opposite of a perfect Earth, fine tuned for our survival. Rather we are part of the vertebrate lineage, which is part of the eukaryotic lineage, which is

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[890] Page 33.
[891] Charles Birch, *Biology and the Riddle of Life* (Sydney: UNSW Press, 1999), p. 102-03.
[892] Diamond, "New Guineans and Their Natural World," pp. 263-64.
[893] Ibid, p. 267.
[894] Jared M Diamond, *Ecological Collapses of Pre-Industrial Societies* [internet] (2000 [accessed 1 October 2004]), available from http://www.tannerlectures.utah.edu/lectures/Diamond_01.pdf.
[895] Jared M Diamond, *The Broadest Pattern of Human History* [internet] (1992 [accessed 1 October 2004]), available from http://www.tannerlectures.utah.edu/lectures/Diamond93.pdf.
[896] Veronica Brady, "Called by the Land to Enter the Land," in *Creation Spirituality and the Dreamtime*, ed. Catherine Hammond (Newtown: Millennium Books, 1991), p. 38.
[897] Larry Rasmussen, "Theology of Life and Ecumenical Ethics," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 121.
[898] M. Adebisi Sowunmi, "Giver of Life- "Sustain Your Creation"," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), pp. 150-52.

part of the microbial lineage which was selected for its resistance to increasing oxygen levels billions of years ago. We are adapted to Earth, not the other way around.

The rejection of mainstream western thinking, and the desire to bend it into the service of proclaiming Earth as perfect and good is understandable. Certainly it is an advance on the long western Christian tradition of ignoring or vilifying Earth and its creatures, labelling the life community as fallen and marred by sin. It is not, however, a view that can be pursued by those seeking to integrate the findings of ecology and evolutionary biology into Christian theology. Birch offers a sustained critique of romantic approaches to "nature[899]." This style of ecotheology is not actually "eco" theology at all, since it fails to engage with even the basic data from the ecological sciences. It is basically traditional anthropocentric theology, continuing the belief in a pre human Eden marred by human activity, even if it greatly extends the time period over which Eden existed, and holds out hope that the Edenic state can be recovered through responsible human action. It might be called Earth friendly theology, though it is difficult to know exactly what friendly means in this context. It seems to mean slightly different things to different authors, but most agree that it is, or was meant to be, friendly.

9.3.2.1 Finitude as evil

Sally McFague, for example, emphasises a web of life which exhibits, "the *solidarity* of each with all," such that, "all life forms *share* the basic goods of the planet (emphasis mine).[900]" It may be arguable that all are in solidarity in that they live together on the same planet. In theological use, however, solidarity implies something much more positive and cooperative than what ecology tells us about the interrelationships amongst living organisms. It is absolutely not true that all life forms share resources if by that McFague implies any sort conscious or unconscious generosity. McFague goes on to explain that,

> "A spirit theology focuses attention *not on how and why creation occurred* either in the beginning or over the evolutionary aeons of time, but on the rich variety of living forms that have been and are *now* present on our planet (emphasis mine).[901]"

Yet in romanticising the interactions of these living forms it is debatable the extent to which her spirit theology really does focus attention on present ecology. Further, an understanding of present ecology, its actual nature, is not possible without an awareness of the evolutionary history which produced it. McFague, then, deliberately ignores evolutionary biology as a focus point, and fails to engage with the implications of its details, even though she does mention it at some length[902]. She does, however, engage with the reality of death and pain and suffering, seeing them as natural evils, and tragedies. This attitude is nearly ubiquitous. Even such a staunch atheist and rationalist as Dawkins cannot refrain from making value judgments about the finitudes of life, referring to mass extinction events as "fearful global tragedies," and the disappearance of species in such events as "bad.[903]"

As we have already seen, the Orthodox tradition is quite explicit that nature is not what it is meant to be. According to Zizioulas, the role of humanity is to transform nature, "to a fullness beyond its natural capacities,[904]" to transfigure and cleanse it, "from those elements which bring about corruption and death.[905]"

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[899] Birch, *Biology and the Riddle of Life*, pp. 91-103. See also Birch, "Environmental Ethics in Process Thought," pp. 2-3.
[900] McFague, *The Body of God : An Ecological Theology*, p. 172.
[901] Ibid, p. 145.
[902] Ibid, pp. 103-12.
[903] Dawkins, *Unweaving the Rainbow*, pp. 75-76.
[904] Patricia Fox, "God's Shattering Otherness: The Trinity and Earth's Healing," in *Earth Revealing, Earth Healing: Ecology and Christian Theology*. (Minnesota: Liturgical Press, 2001), p. 100.
[905] Ibid, p. 101.

Those theologians who explicitly engage with the story of evolution agree with the Orthodox, and even with Augustine, that there is such a thing as fallenness, and that corruption and death are a part of that. Torrance affirms the God who is absolutely against finitude,

> "… all physical evil, not only pain, suffering, disease, corruption, death and of course cruelty and venom in animal as well as human behaviour, but also 'natural' calamities, devastations and monstrosities, are an outrage against the love of God and a contradiction of good order in His creation.[906]"

Michael Lloyd builds on Torrance to demand that God be against finitude, not only by overcoming it eschatologically, but by being against it from the very beginning[907]. Yet evolutionary biology forces those who engage with it to substantially revise Augustine's doctrine. Barbour is a typical example,

> "…creation, the fall and redemption *were* understood as separate and successive events… *today* we can see them as three *ongoing features* of a single process of continuing creation, continuing fallenness, and continuing redemption (emphasis mine).[908]"

In trying to justify their ongoing reference to a state of fallenness, Barbour and his peers revisit the pre Darwinian explanations for suffering and death in the light of evolutionary biology[909]. The explanation most often adopted for revision is the idea that suffering occurs because God's gift of free will to humans necessarily enables us to choose to do evil[910]. The evils of pain and death, then, are not an inevitable property of life, but the result of the decisions made by free agents to turn from the God of life.

In a post Darwinian world, however, free will cannot be attributed solely to humans, but to all life forms in proportion to their consciousness. This explains, it is thought, the presence of pain and death before the evolution of humans, since God allowed the *whole creation* freedom. Korsmeyer tries to tell the evolutionary story in terms of the freedom which God, through voluntarily limiting God's self, granted to creatures,

> "It is as though Divinity laboured to persuade, to lure creatures forward, creatures who sometimes responded to the invitation, and sometimes did not. But God obviously did not tire of the game, even after being resisted for billions of years. The spectacle of evolution suggests God at work with stubborn individuals who had some power of self-determination[911]."
>
> "Consider over a hundred million years of dinosaurs, half of which savagely hunted and ate the others. To what end? Was God pleased in some way with this spectacle?[912]"
>
> "God's power is solely persuasive. God persuades creatures into being, *granting* them some power of creativity, but not just because God decides it would be nice to

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[906] Torrance, *Divine and Contingent Order*, p. 139.
[907] Michael Lloyd, "Are Animals Fallen?," in *Animals on the Agenda: Questions About Animals for Theology and Ethics*, ed. Andrew Linzey and Dorothy Yamamoto (London: SCM, 1998), p. 155.
[908] Barbour, *Nature, Human Nature, and God*, p. 50.
[909] Rachels summarises these pre Darwinian explanations before examining the ways in which they have been reworked (Rachels, *Created from Animals*, p. 104.)
[910] Barbour, *Nature, Human Nature, and God*, p. 34, Edwards, *The God of Evolution: A Trinitarian Theology*, p. 35, Anthony Lowes, "Up Close and Personal: In the End, Matter Matters," in *Earth Revealing, Earth Healing: Ecology and Christian Theology.* (Minnesota: Liturgical Press, 2001), p. 139, McFague, *The Body of God : An Ecological Theology*, p. 145, Arthur Peacocke, *Intimations of Reality* (Indiana: Notre Dame, 1984), p. 77, Polkinghorne, *Scientists as Theologians*, p. 45, Rolston III, *Science and Religion*, pp. 64-70.
[911] Korsmeyer, *Evolution and Eden*, p. 84.
[912] Ibid, p. 85.

> do so… Love must share, love requires others… God has all the power that a God could have who created a world with creatures who are really free.[913]"

> "… these created, evolving entities are finite and what is good for one often means a bad result for others, and because *these creatures resist the divine call* and seek selfish ends, natural evil is produced. Some beings survive, others do not (emphasis mine).[914]"

Yet this explanation ignores the fact that much of the pain and death on Earth, and the most spectacular extinctions, have been dictated by *physical* events[915]. They are caused by volcanic eruptions, solar flares and meteor strikes. Unless these things are also somehow resisting the divine lure (a proposition Korsmeyer specifically rejects[916]), then much of the death and suffering on Earth is *not* the result of freedom, and remains unexplained.

If God is *self*-limiting then God is logically responsible for the pain and death which many theologians claim is evil, since God *chose* to allow freedom in the creation. God is guilty by omission. Yet Korsmeyer tries to elude this conclusion, claiming that,

> "… it is the divine *nature* to love and create, and impossible for divinity to do otherwise. Therefore God is not morally responsible for the suffering that *occasionally* occurs… *God is physically responsible for evil, but not morally indictable for it* (emphasis mine).[917]"

Firstly, suffering more than *occasionally* occurs. Secondly, this is trickery. If it is *impossible* for God to create a universe which is not free, then God is not self limiting at all, but limited by nature. Yet Korsmeyer does not want to reach this unorthodox conclusion. As he says elsewhere, only beings which are not conscious escape moral culpability when they do evil, whether by commission or omission. Since he claims that God is a conscious agent, God must be morally indictable for any evil for which God is responsible, even if just by refusing to intervene to prevent it. In remaining orthodox in terms of God's omnipotence, we are driven to the unorthodox conclusion that God has sinned through moral omission, since finitude is evil.

An *ontologically* limited God, however, being powerless to stop evil, would not be morally responsible for it. Such a God may be totally benign, but powerless to enact his/her benign desires. So claim the process theologians,

> "Process theologians hold that the limitation of God's power should not be thought of as a voluntary self-limitation, as if retaining omnipotence was an option that God decided to give up.[918]"

So the process God has not *chosen* to allow the world to be the way it is, and is therefore not morally culpable for evil. Like the free will theorists, however, they must still address how God *does* relate to, and shape, the world Here the free will theorists and process theologians reach basically the same conclusions.

Barbour, a process theology devotee, proposes that God *persuades* rather than coerces[919]. Korsmeyer agrees, adding the logical conclusion that if God can only persuade, God can be resisted. It is worth repeating a little of his line of thought,

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[913] Ibid, p. 96.
[914] Ibid, p. 123.
[915] Rachels, *Created from Animals*, p. 105.
[916] Korsmeyer, *Evolution and Eden*, p. 106.
[917] Ibid.
[918] Barbour, *Nature, Human Nature, and God*, p. 101. Also McDaniel, *Of God and Pelicans*, p. 24.
[919] Barbour, *Nature, Human Nature, and God*, p. 34.

> "It is as though Divinity laboured to persuade, *to lure creatures forward, creatures who sometimes responded* to the invitation, and sometimes did not. But God obviously did not tire of the game, even after being *resisted* for billions of years**.** The spectacle of evolution suggests God at work with *stubborn individuals* who had some power of self-determination, urging them to creatively advance (emphasis mine).[920]"

While it is logical, it is also bizarre. Korsmeyer does not elaborate on how microbes could resist the divine lure, let alone stubbornly. Edwards accepts that biologists see no evidence that evolution is guided by God,

> "… comments such as those of Ernst Mayr need to be taken seriously by theology… What a biologist can say… is that the appearance of design in the eye or the brain can now be explained satisfactorily by the theory of natural selection, and there is no evidence from biology that an external divine designer is needed…I am inclined to accept his conclusion… it is possible to think of God's purposes being achieved through what appears to empirical biology to be without purpose.[921]"

But he cannot resist using the same vague language as the others to claim that evolution is, nonetheless, theologically purposeful,

> "The power of self-transcendence comes from *within* creation itself, but it is a power that finally comes not from nature but from the ongoing creative activity of God. God *upholds and empowers* the process of evolution *from within*, as the power enabling creation itself to bring about something new. God, then, is not understood as intervening as one cause among others but as *the always present, dynamic Creator* enabling creatures not only to exist but also to *transcend themselves* and become what is new.[922]"

He does not, however, explain what any of this actually means or would look like. Polkinghorne correctly says of such attempts,

> "Primary causality seems nothing more than the imposition of a mysterious theological gloss on natural process.[923]"

He therefore rejects both the necessarily limited, and self limited, models of God, since they give an inadequate account of divine action, "… which seems to be restricted to the role of a powerless pleading from the margins of occurrence.[924]"

Polkinghorne's solution is the principle of emergence, of top down causality, and of the role of information in systems,

> "… it seems coherent to believe that God's action could be in the form of *pure active information*. This would afford a particular character to divine agency, consonant with theology's insistence that God is *pure spirit*.[925]"

Edwards finds this idea limited but useful[926], as does Barbour[927]. Yet there is no such thing as pure active information. *Something else* acts on information. It also seems to underestimate the extent to

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[920] Korsmeyer, *Evolution and Eden*, p. 84. Also cited on page 158 of this thesis.
[921] Edwards, "Evolution and the Christian God," p. 182.
[922] Edwards, "For Your Immortal Spirit Is in All Things," pp. 50-51.
[923] Polkinghorne, *Scientists as Theologians*, p. 31.
[924] Ibid, p. 33.
[925] Ibid, p. 40.
[926] Edwards, "Evolution and the Christian God," pp. 166-67.
[927] Barbour, *Nature, Human Nature, and God*, p. 30.

which the body controls the mind's thoughts and moods, which would imply that creation controls God. Polkinghorne's work focuses particularly in physics, in quantum events, so he does not provide a convincing explanation of how this pure information would influence the shape of biological evolution as we see it unfolded.

In short, the various contributors provide convincing reasons why each other is wrong, or at least insufficient.

So there is a broad range of opinions on the relationship between God and life. Creationists posit enormous coercive intrusions. Intelligent design theorists propose more modest, ongoing coercive intrusions. Roman Catholicism requires at a bare minimum divine intrusion to ensure that each human carries a divine soul. The limited God theorists argue that there is no coercion, but persuasion, though they offer no examples of what that would mean, nor any evidence that contradicts the assertions of biologists mentioned by Edwards above.

What they do is show convincingly why their peers are wrong. Even though the question of divine action remains at the top of the science-theology debate[928], James Rachels justifiably complains that no testable proposals are ever forthcoming, especially in biology, and that God has apparently acted in the processes of evolution in such a way that it is reasonable to conclude that God has not acted in the process at all[929]. Where is this persuasion meant to occur, or to whom is the pure information made available? If God is influencing the biological (including neural) forms that evolution has produced, then God must be acting persuasively at the level of genetic recombination events, or as an alternative to natural selection. If God has guided evolution towards the creation of *H. sapiens*, then God presumably also manipulated the path of comets and the eruption of volcanoes (since they were crucial events in our evolution), which returns us to the coercive, intrusive God of the creationists.

What the process and self-limiting camps have in common is the declaration that death and pain are necessary *evils*, and the hope that both will, eventually, be overcome. That is, although their integration of science and theology leads them to recast divine omnipotence in novel ways, they retain a very traditional view of death, and God's ability to overcome it in some final eschatological era.

This hope in life after death is immensely appealing, to me no less than many others. On the one hand, our individual biological death is essential if others are to follow us and have a chance at life, and so it is to be strongly affirmed, even celebrated. On the other hand, I freely admit that such celebration will be difficult when my time comes, certainly for me, and hopefully for my family and friends. I have for many years since becoming a Christian softened the stark reality of my own death by imagining that the afterlife involved being able to travel, somehow bodily and spontaneously, throughout the vast array of galaxies and planets in the universe, to finally be able to admire and explore God's amazing creation. It seemed obvious that this is what God would want. So I empathise with the desire to escape finitude and especially death. This hope is widespread, even amongst those theologians who grapple seriously with science. For Polkinghorne, for example,

> "The ultimate futility of this present universe points us to looking beyond the physical world itself to the eternal faithfulness of the God who raised Jesus from the dead, if there is to be found a ground of true hope and everlasting fulfilment.[930]"

McDaniel also hopes that death is less final than biologists suggest. He suggests that after death the souls of animals continue to travel towards a final union with the divine soul. It is at this point, when they merge with the divine soul who has integrated and made whole all their suffering as well as all

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[928] Polkinghorne, *Scientists as Theologians*, p. 41. Philip Clayton, "Natural Law and Divine Action: The Search for an Expanded Theory of Causation," *Zygon* 39, no. 3 (2004): p. 616.
[929] Rachels, *Created from Animals*, pp. 122-25.
[930] John Polkinghorne, "Physics and Metaphysics in a Trinitarian Perspective," *Theology and Science* 1, no. 1 (2003): p. 48.

their joy, that they die[931]. I am not sure whether his delayed death really helps much at all. I empathise with Robert Russell in his desire for a grand eschatological vision, one which we participate in and consciously apprehend. And his inclusion of other animals is a logical necessity now that we have rejected ontological discontinuity. Yet it is precisely his vision which convinces me that eschatologies which imagine a place and time without suffering and death are untenable. Hoping to transcend the limitations of Barbour and Hefner, Russell promotes the idea of humans as "eschatological companions," of the rest of creation, and spells out his vision of the eschatological event,

> "Starting with the events at Easter, God will act *to transform the laws of nature* to produce the 'new creation.' In the coming reign of God, we will not leave behind the coral reefs… or the countless species now long extinct… If the Resurrection of Jesus… is an indication of what lies in store for the *universe*, then the future will be a *transformation of the laws of nature* as we now know them into something *so transcendently joyous that weeping and pain and disease and dying will be nevermore*, and '*the lion will lie down with the lamb*.' Somehow, all nature… is destined to eternal life with God in community with each other, *a community of unending and bliss-filled experience* (emphasis mine).[932]"

But if we are to bring the coral reefs with us, then presumably we will also bring the stonefish which can kill us in a torturous moment. If the supposed laws of nature are changed so much that death and pain and reproduction cease[933] to be, then will we really in any way be ourselves? Russell's vision seems particularly odd in that he was, as already mentioned, so strong on the fact that ecotheology needs to take seriously the non-static nature of creation. If there is no death or reproduction in his eschaton, then it must necessarily be static. Even if heaven did only contain humans- it is hard to see how we could still be ourselves if transformed from the constantly changing biological organisms we are into eternally static ones. Would dead babies and the profoundly intellectually disabled live forever in their state at death? And if not, what possible connection could there be between their soul, which would presumably have a high level of relationality to other souls, and their actual bodily self? Finally, I have been around happy people. I wouldn't want to spend eternity with them. This is not a flippant point. An eschaton with no pain or sorrow, or regret, or hurt, an eschaton of eternal static bliss- a kind of Prozac paradise, would be rather a Stepford hell.

With the romantic ecotheologians above, then, the evolution-engaged theologians so far surveyed continue to assume that the world ought to be benign; that this is the way God would have wanted it, if only it had been possible. This presumably stems from the Judeo-Christian declaration that Earth is very good. Theologians then seem to almost unanimously assume that a good world is a benign one. It is time to re-examine that assumption, and to reflect on the implications for theology if it is not.

Ecology and evolutionary biology say that death and pain are inevitable, as is suffering for conscious organisms. The evolution engaged theologians say that these things are the result of freedom and free will. They could have been avoided if life made the right choices, since they are the by product of the tendency of free life forms to resist the "divine lure." The two world views are, then, fundamentally incommensurate. For theology to achieve consonance with the science story it will need to embrace death and pain as inevitably built into the nature of the living world. Ideally, it would even be able to celebrate their existence, since they are essential to the ongoing evolution and interactions of life. Is

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[931] Jay B. McDaniel, "Can Animal Suffering Be Reconciled with Belief in an All-Loving God?," in *Animals on the Agenda: Questions About Animals for Theology and Ethics*, ed. Andrew Linzey and Dorothy Yamamoto (London: SCM, 1998), pp. 170-71, McDaniel, *Of God and Pelicans*, pp. 45-46.

[932] Robert John Russell, William R Stoeger, and Francisco J Ayala, eds., *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action* (Vatican City State: Vatican Observatory Publications, 1998), pp. 156-57.

[933] Thankfully, sex could continue as long as one of the "laws of nature" which God changed is the link between reproduction and sex. S/he could, for example, render us all infertile. This would seem less difficult than changing the laws so that we no longer need to eat.

such a death affirming theology possible, not just in the evolutionary past or biological present, but even in the eschatological future?

Eddie Kneebone, a member of the Church of Jesus Christ of Latter Day Saints (Mormons), answers in the affirmative for the past and present,

> "Aboriginal spirituality is the belief and the feeling within yourself that allows you to become a part of the whole environment around you…the natural environment… *birth, life and death are part of it and you welcome each…*[934]"

As for the eschatological future, that is of no interest in the kind of cyclical theology which Kneebone recognises in Aboriginal theology, with its ever present Dreaming rather than a hope for a heavenly eternal life[935].

Ecofeminists have also engaged with, and generally affirmed death- both past, present and future.

9.3.2.2 Finitude as good

Catherine Keller argues that God is not, "… 'prolife' but *of life*: the life of the world, the spirit of a chaosmos *in which death circulates through every living process*. (second emphasis mine).[936]"

Rosemary Radford Ruether has, very influentially, argued for the acceptance of death from 1971[937] to the present[938],

> "In nature death is not an enemy, but a friend of the life process[939]… Immortality lies not in the preservation of our individual consciousness as a separate substance but in the miracle and mystery of endlessly recycled matter-energy out of which we arose and into which we return.[940]"

In her later work Radford Ruether mentions the work of Ivone Gebara[941], who argues that we must get past the systems we have created which, "… have not allowed us to perceive the ephemeral nature of our individual lives and projects…[942]"

The affirmation of death is not limited to ecofeminism. For example, Wesley Granberg-Michaelson is inspired by agricultural reality to challenge his readers with the thought that,

> "Organic gardeners know that biologically, life comes out of death. Should not this be understood as part of the goodness, or rightness, of the creation, declared in Genesis?[943]"

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[934] Eddie Kneebone, "An Aboriginal Response," in *Creation Spirituality and the Dreamtime*, ed. Catherine Hammond (Newtown: Millennium Books, 1991), p. 89. I could not find any details about his connections to the Mormon Church or wider Christianity, but the same article suggests that his connection is fairly nominal, suggesting for example that God is to be found in the environment, not churches built by people (page 93).
[935] Ibid, pp. 89-90.
[936] Keller, *Face of the Deep*, p. 222.
[937] Rosemary Radford Ruether, "Mother Earth and the Megamachine," in *Womanspirit Rising: A Feminist Reader in Religion*, ed. Carol Christ and Judith Plaskow (New York: Harper & Row, 1979), p. 52. Cited, not seen in Andrew Dutney, "Bioethics, Ecology and Theology," in *Earth Revealing, Earth Healing: Ecology and Christian Theology*. (Minnesota: Liturgical Press, 2001), page 9 of an early unpublished draft.
[938] Ruether, "Ecofeminism: The Challenge to Theology," pp. 104-08.
[939] Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*, p. 53.
[940] Ruether, "Ecofeminism: The Challenge to Theology," p. 103.
[941] Ibid, p. 105. Gebara writes out of the Latin American liberation theology movement, pursuing, as she puts it, an urban ecofeminism.
[942] Gebara, *Longing for Running Water*, p. 166.
[943] Wesley Granberg-Michaelson, "Creation in Ecumenical Theology," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 104. Note that Granberg-Michaelson uses one theological affirmation

Andrew Dutney has accepted the challenge from ecofeminism and his own life experiences to take death seriously, both biologically and eschatologically,

> "… the questions [about the nature of death] will not go away... Theology will not be able to leave the questions of personal death unexplored indefinitely. It may well fall to ecological theologies to replace theories of the immorality of the soul - now worn to the point of being dangerous - with a more creedal and, indeed, Christian account of the 'resurrection of the body.'[944]"

His own account of the resurrection of the body does not refer to individual resurrection of somehow conscious persons, for he does not expect to consciously survive his death[945]. He explicitly affirms not only the necessity and value of biological death, but the reality of eschatological death. He recognises the trauma that such a total embrace of death causes traditional theology,

> "There is no question that this emphasis causes much tension in the theological conversation with bioethics. Received Christianity has a heavy investment in a spirituality organized around the identification of the person with an immortal soul which survives the death of the body. The questioning of that piety draws strong reactions.[946]"

So strong, indeed, that in response to reactions from co-contributors to the book for which he wrote the article, the above reflections were omitted from the final version[947]. And so the final section, originally entitled "Bioethics, Ecology, Theology and … Death" is, in the published book, simply "Bioethics, Theology and Ecology.[948]"

Yet ecofeminism explicitly questions "that piety." It does not simply ask us to acknowledge our personal biological mortality; it opposes even the hope for eschatological immorality. The hope for heaven is a form of escapism which prevents us engaging with out finitude filled lives on Earth[949]. Habel labels the desire to escape Earth, Heavenism[950], but does not believe that the hope for eternal life necessarily engenders this attitude. I tend to agree.

There are countless examples in Christian history of people who, convinced that they would have eternal life with God, risked and even embraced death in the cause of engaging fully with life around them. So whilst I agree that the desire for eternal life can express itself in Heavenism, I do not think it necessarily needs to. There is nothing intrinsic to biocentric theology which *requires* us to reject any possibility of an eternal, "spiritual" life in Heaven. Russel's attempt[951], however, shows the difficulty of envisaging how our present biologically grounded life could relate to that a heavenly afterlife in any meaningful way. Process theology's attempts to equate eternal life with somehow living on in the memory of God is touching, but being remembered is not the same as being alive. At this point, then, I side with the ecofeminists who call us to embrace our biological finitude, and accept that this represents the end of our life.

In an evolutionary context, this leads to the question of what we make, not only of our own personal death, but the death of our entire species. Not surprisingly, some reject this outright, assuming that the

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in Genesis, the goodness of creation, to critique its other claims. I will explore what other theologians make of the claim that creation is "good" in the section on the benign web of life.

[944] Andrew Dutney, "Bioethics, Ecology and Theology (Unpublished Draft)," in *Earth Revealing, Earth Healing: Ecology and Christian Theology*. (2001).

[945] Dutney, *Food, Sex and Death*.

[946] Dutney, "Bioethics, Ecology and Theology (Unpublished Draft)."

[947] Andrew Dutney, 16 August 2004.

[948] Dutney, "Bioethics, Ecology and Theology," p. 226.

[949] Ruether, "Ecofeminism: The Challenge to Theology," p. 106.

[950] Habel, *Resource Manual for a Season of Creation*.

[951] Page 162.

ongoing presence of humans on Earth is an obvious good. Others are more open to human extinction as a necessary evil on the way to the even more conscious species which might replace us. Others reject this manoeuvre, claiming that neither humans nor consciousness are an irreplaceable pinnacle of creation.

9.4 Can theology embrace the extinction of *Homo sapiens*?

It will come as no surprise that many of those who believe that death is an evil decry the possibility of human extinction. This appears to be based not so much in anthropocentrism, as anthropo*telism.*

9.4.1 No: Anthropotelism

Anthropotelism[952] is the assumption that *H. sapiens* is the *end point* of evolution, the consummation of the entire process. This is usually accompanied by an assumption that the dominant form of development of life on Earth has shifted from biological evolution to some sort of cultural evolution, which, for humans at least, superseded[953] and can override our biological legacy[954]. Often, it sounds as if biological evolution has basically stopped[955]. So too, presumably, has the need for extinctions.

The many expressions of this view are reminiscent of the work of Teilhard de Chardin[956], whether acknowledged or not. *H. sapiens* represent a new emergent stage in evolution, and Christ was the ultimate human, the Omega point towards which God has lured all life. The next phase is either the perfection of humanity, or the in breaking of God's eschatological consummation in which the Earth is transformed. Either way, humans represent the latest, greatest, and final phase of evolution,

> "The history of the universe *reaches its climax* when the creative Ground of the whole cosmic process engages in self-giving love with *the universe* come to consciousness in free *human persons* (emphasis mine).[957]"

The ongoing influence of Chardin was evident at the recent *Christianity after Darwin* conference held in Adelaide. The first two papers explored emergent Christology and the concept that life was processing towards Omega[958]. Tony Kelly used Chardin to argue that the interplay of morality and culture amongst humans was the stage upon which the final emergent phase in the universe arises: where humanity freely creates itself into the existence of which Christ was a proleptic example[959].

This theme is common amongst the most well known practitioners of the science-theology dialogue. For example Peacocke argues that Christ,

> "… can properly be regarded as the *consummation* of the purposes of God already manifested incompletely in evolving humanity… Jesus the Christ is thereby seen… as the paradigm of what God intends for all human beings, now revealed as having the potentiality of responding to, of being open to, of becoming united with God….

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[952] A word I believe I have coined. It is not found in the Oxford dictionary or Google. There is a much worse new word to come, unfortunately.
[953] Birch, *Biology and the Riddle of Life*, p. 78, McFague, *The Body of God : An Ecological Theology*, p. 148, Michollet, "Evolution and Anthropology," p. 86. The mistake is present even in scientific texts. Southwood, for example, says that biological evolution of *Homo sapiens* stopped 50,000 years ago, when cultural evolution took over (Southwood, *The Story of Life*, p. 229.) Gould claims that this mistaken view is widespread in science (Gould, *The Structure of Evolutionary Theory*, p. 78.)
[954] Barbour, *Nature, Human Nature, and God*, p. 42.
[955] Gilkey, *Nature, Reality and the Sacred*, p. 153.
[956] A useful collection of his speculations about the implications of evolutionary science for theology is Teilhard de Chardin, *Christianity and Evolution*, trans. René Hague (London: Collins, 1971).
[957] Edwards, *Creation, Humanity, Community*, pp. 58.
[958] Cameron Freeman, "Heading Towards Omega?" (paper presented at the Christianity After Darwin: Doing Theology in an Evolutionary Context, Adelaide, Australia, September 2004), Kelly, "An Emergent Christology".
[959] Kelly, "An Emergent Christology".

> He represents the *consummation of the evolutionary creative process* that God has been effecting in and through the world.[960]"

> "… on *Earth* the epic of evolution is *consummated* in the Incarnation in a *human person* of the cosmic self-expression of God… (emphasis mine).[961]"

So the anthropotelic assumptions of some evolutionary theologians are intimately related to the Christotelic tradition of Christian theology. If Christ is an endpoint, a consummation, then so must be his species. First a Catholic quote, then a Protestant one,

> "For, the fact that God himself [sic] is man [sic] is both the unique summit and the ultimate basis of God's relationship to his [sic] creation… The positive nature of creation… reaches its qualitatively unique climax, therefore, in Christ. For, according to the testimony of the faith, this created human nature is the *indispensable* and *permanent* gateway through which everything created must pass if it is to find the perfection of its eternal validity before God[962]"

> "If man [sic] is thus the self-transcendence of living matter, then the history of nature and spirit forms *an inner, graded unity* in which natural history develops towards man [sic], continues in him [sic] as *his* [sic] history, is conserved and surpassed in him [sic] and hence reaches its proper *goal with and in the history of the human spirit.* [963]"

Gordon Kaufman is thoroughly anthropotelic, even though he admits that this brings him into conflict with the insights of biology, which he rejects in favour of his received theological tradition,

> "As a strictly biological event, [human extinction] would probably be no calamity; many species have appeared on earth, thrived for a time, and then become extinct. *But more must be said than that*…we humans… are 'the point farthest out' of the cosmic-historical process…with the power to take some measure of direct responsibility for the further unfolding of that very creativity. Thus the *central Christian claim* that God has irrevocably bound God's self to humanity by becoming incarnate in contingent human history receives momentous new meaning. *Our fate on earth has become God's* (emphasis mine).[964]"

> "[the disaster we may bring through nuclear war]… will not be one of merely human consequence, the obliteration of our species… [but] a disaster for *all of life*, for the long, slow, painful evolution through which life has proceeded here on earth, *finally reaching new dimensions of meaning and value with the appearance of love and truth and self-consciousness and freedom as human history has unfolded. It will be, in short, a disaster for God*, an enormous setback for which we humans in this generation will have been responsible (emphasis mine).[965]"

Christotelic faith was easy to maintain in the early days, perhaps even years after Christ died. A few decades later, when the New Testament witnesses were being written, we see the beginnings of the struggle to maintain faith that Christ was somehow the endpoint of history, given that life seemed to be continuing in his absence. For nearly two thousand years

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[960] Arthur Peacocke, "The Challenge and Stimulus of the Epic of Evolution to Theology," in *Many Worlds: The New Universe, Extraterrestrial Life and the Theological Implications*, ed. Stephen Dick (Pennsylvania: Templeton Foundation, 2000), p. 114.
[961] Ibid, p. 115.
[962] Karl Rahner, *Theological Investigations*, trans. Joseph Denceel and Hugh M. Riley, 23 vols., vol. 3 (London: Darton Longman & Todd, 1961), p. 43.
[963] Peacocke, *God and the New Biology*, p. 80.
[964] Kaufman, *Theology for a Nuclear Age*, p. 44.
[965] Ibid.

Christians continued to struggle with the increasing length of the delay, but prior to geological discoveries of the age of the Earth it was still relatively easy to come up with convincing answers. It was still assumed that the Earth was only thousands of years old, that humans had always been here and always would be until the final eschatological moment when Christ returned. It was also widely assumed that when Earth was finally consumed, that would be the end of the universe.

In the evolutionary context in which we find ourselves, it strains credibility to believe that the Christ event is an end point of universal history, or even Earth history. For one thing, humans are not the end point of history; we are a mid point of Earth history and very near the beginning of the history of this universe. To think that the most significant event in the universe's life, or even Earth's life, has come and gone is, I believe, anthropocentrism gone mad.

9.4.2 Yes: Consciousness-telism[966]

When we look closer at Kaufman's logic we can discern a more fundamental claim in his thinking than the idea that *humans* are the purpose or endpoint of evolution. It is because *Homo sapiens* manifests *self-consciousness* and *freedom* that it is such a valuable species. Peacocke[967], Edwards[968] and others[969] admit that there may have been incarnations on other planets, since it is *sentience* and *self-consciousness* which are the fundamental properties to which God relates. It should follow, then, that if it was necessary for *Homo sapiens* to go extinct in order for the evolution of a new Earth creature with even higher levels of sentience, self consciousness and freedom, our passing would have to be affirmed as necessary for the greater good.

Along with Polkinghorne[970], Cameron Freeman claims that evolution on Earth is directed towards the evolution of self-conscious beings, not *H. sapiens* in particular. He further acknowledges the inevitable extinction of humans, and even celebrates it as a necessary part of the ongoing evolution of life into forms with even higher levels of self-consciousness[971].

Given that anthropotelism is biologically untenable, even on Earth, is consciousness-telism a more viable alternative? Does it make better use of the data from evolutionary biology? Ironically, even though Freeman relies predominantly on Gould for his evolutionary lens[972], he dismisses one of Gould's main emphases; that the evolution of life is completely contingent, and the emergence of consciousness is a chance event, unlikely to ever be repeated[973]. We have already seen that Gould is not alone when he rejects any sort of 'telism', whether towards humans or consciousness. This includes those scientists who are open enough to theology to engage in sustained dialogue.

Stephen Dick, for example, is an historian of science. He rejects the idea that humanity is central to the story of the universe, accepting that we are not likely to be the special object of attention of any deity, purely as a result of the enormous time scales involved,

> "… humanity is most likely *somewhere near the bottom, or at best midway, in the great chain of intelligent beings in the universe*. This follows from the age of the

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[966] I must agree with my wife that this word, which I also coined, is a real shocker, but it is less of a mouthful than repeatedly expressing the idea it conveys, that the evolution of life is directed towards the production, not of humans, but of self-conscious beings. I promise to use it as sparingly as possible. At least I did not call it self-consciousness-telism!
[967] Peacocke, "The Challenge and Stimulus of the Epic of Evolution to Theology," p. 114.
[968] Edwards, "Extraterrestrial Life and Jesus Christ."
[969] The possibility of God being in relationship with extraterrestrial self-conscious beings has been accepted since Medieval times, though its popularity has waxed and waned (Peters, *Science, Theology and Ethics*, pp. 123-32.)
[970] Polkinghorne, *Scientists as Theologians*, p. 47).
[971] Cameron Freeman, July 2004. Freeman presented two papers at *Christianity after Darwin*, which restricted themselves to anthropotelic musings.
[972] Freeman, "Heading Towards Omega?". Chapter 8.2.2 shows the perils of limiting one's self to Gould.
[973] Gould, "Introduction," pp. xii-xiii, Gould, *The Structure of Evolutionary Theory*, pp. 1332ff.

> universe and the youth of our species. The universe is in excess of ten billion years old. The genus *Homo* evolved only two million years ago…[974]"

Although Dick's reference to a chain of intelligent beings sound consciousness-telic, he is really only using this as an argument for contingency and against anthropotelism. He does not produce any data in support of consciousness-telism, nor does he try to argue that it actually exists. Christian de Duvre is another scientist writing in the same collection of papers as Dick. He, too, acknowledges the central role of contingency,

> "… the variations offered to natural selection are induced by causes that are unrelated, except in a strictly fortuitous manner, to the evolutionary advantages their effects may entail. *It rules out any form of directionality* imposed on the evolutionary process by some hidden guiding principle and is consistent with *the rejection of vitalism and finalism…It is supported by all we know of evolution* as it takes place today and by all the findings of molecular biology.[975]"

The emergence not only of *H. sapiens*, but of intellect, is highly contingent, and due not to some sort of vitalistic pursuit of rationality, but for much more mundane survival advantages through our evolutionary ancestry,

> "It must be remembered that the senses whereby the human brain apprehends the surrounding world were *refined by natural selection as tools of survival, not of knowledge* (emphasis mine).[976]"

Nonetheless, he believes that ongoing "vertical evolution" will probably occur, and may lead to,

> "… beings endowed with considerably sharper means of apprehending reality than we possess. *Such beings could arise by further extension of the human twig, but they do not have to*. There is plenty of time for a humanlike adventure to start all over again from another twig and perhaps go further than did the human adventure.[977]"

Humans are merely,

> "… a transient link *or perhaps even a side branch* in a long evolutionary process very likely to give rise some day to beings *much more advanced* that we are.[978]"

Although de Duvre describes intellect as a cosmic watershed, he also deliberately undermines its cosmic significance or value. He reminds us that our intellectual abilities are, actually, extraordinarily feeble. He reminds us that we can only hope to apprehend the creator of the entire universe in the most profoundly limited way. Even if there was such a thing as the peak of human intellectual endeavour, it still amounts to very little.

The final nail in the coffin of consciousness-telism is driven home if Ward and Brownlee's summary of the scientific story of the future of Earth is correct[979]. de Duvre may be correct that more "advanced" beings will follow us in the near future, but the mid to far future belongs to the brainless, small and simple; on an Earth in which consciousness, because of the oxygen needed to maintain it, is a fatal disadvantage.

So if those who engage at depth with the scientific data are correct, the evolutionary unfolding of the universe, even Earth, is not only not anthropotelic, but not even consciousness-telic. Nonetheless,

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[974] Dick, "Cosmotheology," p. 201.
[975] de Duve, "Lessons of Life," p. 7.
[976] Ibid, p. 10.
[977] Ibid, p. 11.
[978] Ibid, p. 12.
[979] Refer back to page 127 of this thesis.

because of the massive time scales involved, it is possible that there will be "more conscious" organisms on Earth, and the rest of the universe.

I conclude that consciousness-telism is no more scientifically viable than anthropotelism. Both humanity and self consciousness are contingent, and ephemeral parts of life, and a tiny part of life at that. This fits well with the image of life as a pulsing flow, rather than a hierarchical pyramid. Every aspect of life, for the time it exists, contributes to God's experience of an other; helping liberate God from a static eternity. Let us further explore the possibilities of a universe where life's only *telos* is to live, and where we affirm the extinction of *Homo sapiens* without needing to believe that we will give way to something "better." There seem to be two ways of affirming human extinction in this context.

9.4.3 Yes: For *everything* there is a season.

One view accepts that, were other creatures granted consciousness, the vast majority would declare *H. sapiens* to be an evil presence on Earth. We as a species have a negative instrumental worth to almost all life. The salvation of most complex plants and vertebrates, as individuals, would be best served by the immediate extinction of humans and our domesticated animals. To maximise the diversity of life, humans must be wiped out to make room for other species to recover and contribute their unique experiences to the richness of God. As McDaniel says, as far as most organisms are concerned, humans are brutal neighbours[980]. From this view, the quicker the oppressor is removed the better.

The Judeo Christian tradition, from Exodus to the Revelation to John, provides countless examples of the faithful believing that God destroys oppressors. We even read that God, far from putting humans on a pedestal, lamented our existence,

> "The LORD saw that the wickedness of humankind was great in the earth, and that every inclination of the thoughts of their hearts was only evil continually. *And the LORD was sorry that he had made humankind on the earth, and it grieved him to his heart.* So the LORD said, "I will blot out from the earth the human beings I have created - people together with animals and creeping things and birds of the air, for *I am sorry that I have made them*." [981]

An alternative view highlights that the *overall* diversity of life experience, thus God's experience, has been *enhanced* by occasional mass extinction events. It may be that humans, having provided God with a raft of new experiences, have become the latest in a series of these very useful cataclysms. *H. sapiens* is acting in the same way as the asteroid which removed the dinosaurs, and paving the way for the next manifestation of the flow of life and experience. Humanity's ecological impact would then be a *good* part of the process of evolution, enriching the image of God in the long term. Referring back to the John Muir quote with which I opened my introduction[982], we might see that we *were* the burning and extraordinary commotion, which prepared the soil for the next blossoming of life.

In order for life to flourish after a mass extinction event, however, the dominant resource users must go extinct. The dinosaurs had to disappear to free up niches for the mammals. Humans and their livestock use about half of the total plant productivity of the planet[983]. Future generations of species, then, rely on our passage to oblivion.

In the first view humans imperil the very survival of life itself. In the second we simply need to get out of the way, now that we have played our part. Either way, creation is perhaps waiting with eager longing not for our revealing, but for our extinction. This conclusion seems inevitable if we are but plain members of the Earth community, not a product of God's goal orientated manipulation of

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[980] McDaniel, "Revisioning God and the Self," p. 230.
[981] Genesis 6:5-7
[982] Page 9.
[983] Birch, "Environmental Ethics in Process Thought," p. 1. Birch actual figure is 40%, back in 1985, I am guessing that twenty years later, given the massive increase in human population and use of technology, this figure would be at least 50%

evolutionary processes. There is plenty of historical precedent for a non anthropotelic, non hierarchical way of looking at life. Even Calvin reminded us, long before we knew how big the universe really is, that humans are much more like worms than we are like God[984].

North American First People apparently had a relatively flat notion of personhood, which persists even amongst those who now identify as Christian,

> "In one layer of meaning, these four directions hold together in the same equal balance the four nations of two-leggeds, four-leggeds, wingeds and living-moving things- encompassing all that is created, the trees and rocks, mountains and rivers, as well as animals. Human beings lose their status of primacy and 'dominion'. In other words, American Indians are driven implicitly and explicitly by their culture and spirituality to recognise the personhood of all 'things' in creation.[985]"

This echoes the sort of Australian Aboriginal Christian theology encountered outside of the Uniting Church. Kneebone, for example, claims that,

> "Aboriginal spirituality is the belief and the feeling within yourself that allows you to *become a part of* the whole environment around you… all objects are living and *share the same soul/spirit* as the Aboriginal… The soul/spirit is common- only the shape is different… [we] will return through rebirth as a human or animal or even trees and rocks. The shape is not important because everything is equal and shares the same soul or Spirit from the Dreamtime.[986]"

I opened with the words of John Muir, one of the earlier North American "nature writers." Henry Beston is a slightly later example of the Western Tradition,

> "We need another and a wiser and perhaps a more mystical concept of animals. Remote from universal nature and living by complicated artifice, man [sic] in civilization surveys the creature through the glass of his knowledge and sees thereby a feather magnified and the whole image in distortion. We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And therein we err, and greatly err. For the animal shall not be measured by man [sic]. In a world older and more complete than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren. They are not underlings. They are other nations - caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of the earth.[987]"

Mary Midgley reminds us that, theologically, intelligence is not everything, even *within* the human species,

> "…being clever is not obviously so much more important than being kind, brave, friendly, patient and generous.[988]"

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[984] For example, "The majesty of God is too high to be scaled up to by mortals, who creep like worms on the earth." (John Calvin, *Institutes of the Christian Religion*, book 2, chapter 6 section 4.)

[985] George Tinker, "The Full Circle of Liberation: An American Indian Theology of Place," in *Ecotheology : Voices from South and North*, ed. David G. Hallman (Maryknoll, NY: Orbis, 1994), p. 223.

[986] Kneebone, "An Aboriginal Response," p. 89.

[987] Henry Beston, *The Outermost House: A Year of Life on the Great Beach of Cape Cod* [internet] (Viking 1962. Republished Owl 2003, 1962 [accessed 22 October 2004]), available from http://fortheloveofanimals.bravepages.com/rings.html.

[988] Mary Midgley, *Beast and Man: The Roots of Human Nature* (New York: Cornell University, 1978), pp. 255-56. Cited in McFague, *The Body of God : An Ecological Theology*, p. 120. I came across similar sentiments repeatedly in my research work on prenatal screening and selective abortion, movingly summarised in the widely quoted poem, *Welcome to Holland* (Emily Kingsley, *Welcome to Holland* [internet] (c1987 [accessed 6 October 2004]), available from http://www.nas.com/downsyn/holland.html.)

McFague accepts that God does not guide evolution, and therefore argues that God desires not rationality, but fecundity and diversity[989]. Carol Christ explicitly rejects the priority of intellect across species, engaging directly with Kaufman. She calls us to see ourselves as different from, but not superior to, other organisms. For example, we may have a relatively developed intellect, but will never fly as gracefully as a swallow, or live as long as a redwood tree[990]. Rather than believing ourselves to be the pinnacle or end point of evolution (or seeing the consciousness we represent as being that), she claims that the,

> "Knowledge that we are but a small part of life and death and transformation *is the essential religious insight* (emphasis mine).[991]"

The "we" in the preceding quotation refers to individual human beings. Yet since Christ believes that *H. sapiens* is not superior to other species, I think it is justified to expand her affirmation by replacing "we" with the entire species, *H. sapiens*. Two pages later Christ acknowledges the possibility of human extinction, though she does not develop its implications for theology,

> "The human species, like other species, might in time become extinct, dying so that others might flourish…[992]"

With a little extension, then, Christ leaves us with a vision of the extinction of *H. sapiens* to make way for future species as a positive event, and its acceptance as *an*, if not *the*, essential religious insight.

Gilkey accepts that human extinction is an essential part of evolutionary life,

> "All in the natural order… even dinosaurs, *even humans* - comes and then goes; *none is necessary*, and then all die. This apparently is as true of species as it is of individuals, of phenotypes… for decades we have failed to see its implications for us as a species… Only through the processes of death and of dying - through selection - does life, especially new life, arise (emphasis mine).[993]"

As with Christ, we can combine this affirmation with his claims about individual death, of which he says, "We cannot live truly and with integrity unless we are willing to die." Indeed, the enjoyment of life within the courageous acceptance of death, "… represents a spiritual achievement of impressive magnitude," which is divinely gifted, a sign of the presence of God[994]. Combining his beliefs about extinction and individual death together, we are challenged to see that the acceptance of the extinction of humans is not *Homo*-phobic, but a spiritual achievement which is evidence of the presence of God. The authors in this section, then, offer us a world view in which we can celebrate human extinction, not as a stepping stone to greater consciousness, but simply as a part of the multi channel pulse of life.

Whilst we are called to celebrate God's richness of experience, this richness is not equated with rationality. Celebrating richness of experience, freed from the –telism of process theology, provides a better framework for understanding God's purpose (or mission) in creating life, and thus the missional calling of the church. Or so I hope to demonstrate now.

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[989] McFague, *The Body of God : An Ecological Theology*, p. 148.
[990] Christ, "Rethinking Theology and Nature."
[991] Ibid.
[992] Ibid, p. 323.
[993] Gilkey, *Nature, Reality and the Sacred*, p. 162.
[994] Ibid, pp. 191-92.

9.5 Biocentric process theology

According to process theology, and many other ecotheologians, God created the world to enable God to experience the world, to have relationships with life, to have something other to love[995]. This is obviously a claim beyond science, but is a non controversial claim within Christianity. Also unanimously agreed is that God is in some sense at least a living person. Process theologians point out that we, as persons, are both unchanging (in that we are the same individual from birth to death), and changing in response to the many relationships and experiences we have. Very reasonably, it seems to me, they apply this dual aspect of personhood to God,

> "Whereas it is true to say that in God's primordial nature God creates the world, it is also true to say that in God's consequent nature the world created God... Our immediate actions eventually perish but yet they live for evermore in the divine memory. This idea that our existence from moment to moment enriches the divine life is part of a stream of thought which stretches at least as far back as Plato and parts of the Judeo-Christian scriptures, through Schelling... Tillich and Whitehead… everything we do makes a difference to God. This is true of the *lesser* creatures also. *God will never be the same again because we have lived and because they also have lived* (emphasis mine).[996]"

Apart from the explicit hierarchy of worth, this conclusion still fits perfectly well with a biocentric approach to theology.

I believe that process theology, though very useful, limits itself by slipping from this God focussed perspective to the perspective of individual creatures, mostly in pursuit of a workable ethical framework. This is certainly the case for Charles Birch, easily the most influential process theologian in the Uniting Church.

The ethical preoccupation becomes the balancing of intrinsic and instrumental worth[997]. The intrinsic worth of an organism is said to be directly proportional to its richness of experience, which is proportional to its self consciousness. Its instrumental worth is said to be its value to others. I have already rejected Barbour's claims that humans are of more value than a mosquito to other animals. What of the claim that God values us more than mosquitos? This is presumably because we have greater richness of experience. But that is meant to be our intrinsic worth, not our instrumental worth.

The easiest way forward seems to be to collapse instrumental and intrinsic worth, which we can do if we maintain a God's eye perspective. If it is true that God created life in order to have rich experiences, to grow and change, then everything has instrumental value to God. There is no such thing as a valueless organism, or even an object. Since the richness of experience of an individual will enhance God's experience of life through that individual, then intrinsic value becomes simply an aspect of the individual's instrumental value to God. To this point process and biocentric theology could, I believe, agree[998].

We must go further, however. Process theologians focus on the *conscious* experience *of individuals*[999]. Their instrumental value to God is that God vicariously experiences the world through their experience. So the more sentient an organism, it is assumed, the richer their experience, and thus the

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[995] For example Barbour, *Nature, Human Nature, and God*, p. 31, Edwards, *The God of Evolution: A Trinitarian Theology*, pp. 14-16, Kaufman, *Theology for a Nuclear Age*, p. 38, Korsmeyer, *Evolution and Eden*, p. 106, Sallie McFague, "God as Mother," in *Weaving the Visions*, ed. Judith Plaskow and Carol Christ (San Francisco: Harper & Row, 1989), p. 144.
[996] Birch, *Biology and the Riddle of Life*, p. 136.
[997] Birch, "The Liberation of Nature," p. 8.
[998] Could any organism then be of no value? Only if God did not exist, and the organism was of no benefit to others. As Christians we can simply reject the possibility on theological grounds, and ecologically declare that it is inordinately unlikely anyway.
[999] Birch, "The Liberation of Nature," p. 9.

richer God's experience through them. There is, then, a hierarchy of value of life to God, and a hierarchy of their possession of the image (ability to relate to) God. But this must be challenged at two levels.

Firstly, process theology is too preoccupied with what *individuals* experience. Since God transcends the material world to some extent, God must also have God's own experience *of* individuals, not just an experience of life through them. God has an experience *of* a mosquito quite independent of that mosquito's experience of itself. God even has experiences *of* mountains, and sunsets. Process theology cannot value a rock[1000], but God can, and so can biocentric theology.

Secondly, process theology's preoccupation with *conscious* experience is far too limited. If God's experience *through* an individual is limited only to the amount of consciousness the organism possesses, then a mosquito may well be of little value. But if we consider the vast array of different sorts of experiences open to God through life, we see that rationality is only one. God, who experiences life through *all* life, experiences life and relationships in ways totally alien to ours. God experiences what it is to fly like a swallow, and grow like a redwood tree. It is the *diversity* of experiences of life[1001], not the *intellect* of the individual, which matters. What God values is the existence of life, and God's experience of and through that life of something other than God. We cannot even begin to imagine what this is like. As Nagel reminds us, even for us to imagine what it would be like to experience life as another mammal, say a bat with its sonar dominated perception of the world, is impossible[1002]. It is hard enough to imagine life as another human.

We can imagine, though, that God might value the life of the last remaining individual of a species over the life of a common, but more sentient being. Process theology seems unable to do this, since more sentient beings have more intrinsic value by definition. Consider the death of the last elephant. From the process view, since the elephant itself has less richness of experience than most humans, this is less tragic than the death of a human. From God's biocentric perspective, when the last elephant dies, God's experience of elephants, and ability to experience life through elephants, ceases. By contrast, the death of one of the billions of humans on Earth leads to far less diminishment of experience. Just how many versions of human experience does God really desire?

Taking God's perspective also turns a common attitude to people with disabilities on its head. A human with trisomy 21[1003] is often less intellectually able and less self-reflective than other humans. In process thinking and Singer's ethics they are thus ranked lower on the scale of intrinsic worth than other humans. Yet their experience of the world will contain unique elements not shared by other humans, and thus their birth stands to enrich God's experience of the world in ways which the birth of another human without that characteristic cannot[1004].

Finally, process theologians like Birch are preoccupied with individuals in isolation. This perhaps reflects their Western context, and preoccupation with practical ethics which have positive outcomes for individual creatures. But it is *God's* experience of biological life overall that we want to maximise. This is almost entirely an experience of relationships. *Through* life forms God experiences their relationships with other life and non-life vicariously. God also experiences each life form vicariously through every other life form with which they have contact. Given all that was said in the science story about the pulsing flow of life, that individual bodies and species are to some extent constructs, it

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[1000] Ibid.

[1001] According to process philosophy, there is no sharp discontinuity between life and non-life, and all entities "experience." For the purpose of this thesis I will stay with the experience of life, since this is the preoccupation of the biological sciences, and since, I believe, extending experience to "non-life" adds nothing to my thesis, except another possible point of contention.

[1002] Nagel, *What Is It Like to Be a Bat?*

[1003] Commonly referred to as Down's Syndrome, and Up's Syndrome by a number of people who have it.

[1004] This is a highly problematic argument if we have not already rejected the controlling, interventionist God who would manipulate people's genotypes so as to have a larger variety of experiences.

is probably more consonant to focus on God's experience of life communities. Or indeed of the life *community*. Long before the last elephant dies, God's experience of elephants in community ceases, their care for each other, their birthing, fighting, love making. Process theology cannot value ecosystems or communities in and of themselves[1005], but God can, and so can biocentric theology.

The experience of life which God has accumulated is overwhelmingly *non human*. This is a staggering insight to try to assimilate into our thinking about our place in the world. Yet God's experience *does* include experience of and through humans, perhaps especially in the life of Jesus of Nazareth. God is enough like us that we can relate to God. We need to accept, however, that we will never understand God or what God wants for the whole of life. All we can know in principle is what God wants from us humans, though we will never fully understand *why*. So we can see Jesus as the revelation of God to us, to tell us what humans should be on about, without pretending to know anything of what God wants for the rest of the world. This humbles our ethical projects enormously. We are compelled to recognise with Albert Schweitzer that,

> "We cannot understand what happens in the universe… It creates while it destroys and destroys while it creates, and therefore it remains to us a riddle.[1006]"

Schweitzer concludes that any ethical decisions about which life to sacrifice and which to save are purely arbitrary, often simply revealing our own bias that the things most like us are the most valuable[1007]. Birch makes just that assumption, and specifically rejects Schweitzer's "reverence for life" ethic because the ethical outcomes are too difficult to apply[1008]. Despite Birch's criticism, there appears to be considerable overlap. Birch argues that Christians are called to have a reverence for life[1009], and Schweitzer, despite his rejection of the *objectivity* of a scheme like Birch's, nonetheless admits that circumstances will force people to decide which life to sacrifice and which to save on a case by case basis[1010]. In earlier work, in apparent contradiction to a rigorous application of his ethic, Schweitzer explicitly states that human life *is* a special case. Though we might put animals out of their misery, the spiritual nature of the human means that we must always preserve their life, even if it causes them suffering[1011]. This seems at odds with his later work, but I found no specific retraction. So he appears to grant an exception to his own biocentric sounding framework. What might a *consistently* biocentric theological framework look like, one which draws on process theology but freed from its consciousness-telism. Does it have anything practical to say to those who desire to live ethically, or is Birch's criticism of Schweitzer equally applicable?

[1005] Birch, "The Liberation of Nature," p. 9. McDaniel does call us to a *love of* communities and systems, but follows Birch in not attributing rights to them, but rather to the entities which comprise them (McDaniel, *Of God and Pelicans*, pp. 89-92.)

[1006] Albert Schweitzer, "Religion and Modern Civilization," *The Christian Century* 51 (1934): p. 1520. Cited in Daly, "Ecofeminism, Reverence for Life," p. 97.

[1007] Albert Schweitzer, *My Life and Thought: An Autobiography*, trans. C. T Campion (London: George Allen & Unwin, 1933), pp. 271-2, Albert Schweitzer, *The Teaching of Reverence for Life*, trans. Richard Winston and Clara Winston (London: Peter Owen, 1966), p. 47.

[1008] Birch, "The Liberation of Nature," p. 9.

[1009] Charles Birch, "Preface," in *The Earth Story in Genesis*, ed. Norman C. Habel and Shirley Wurst, *The Earth Bible* (Sheffield: Sheffield Academic Press, 2000), p. 14.

[1010] Schweitzer, *The Teaching of Reverence for Life*, p. 47.;Schweitzer, *My Life and Thought*, p. 271.

[1011] Albert Schweitzer, *A Place for Revelation: Sermons on Reverence for Life* (New York: Macmillan, 1988), pp. 37-39. This is a collection of sermons preached in 1919. The absolute value attached to human life may reflect the recent horrors of World War I and the desire to leave no excuse for a repetition.

10 A biocentric framework

> "Theology may need a transformation as remarkable as the decentring of humans as the focus of the God-world relationship.[1012]"

Here Nancy Howell suggested as a possibility that which I am arguing to be essential. The suggestion came at the end of Howell's sustained consideration of current knowledge about chimpanzees, and the ever closing gap between them and our species. It represents a true effort to listen to evolutionary biology. Unfortunately, rather than explore the theological implications, Howell focussed on the ethical. She presents a laudable history of the way women have been equated with animals to stress their inferiority in patriarchal cultures, and the pseudo science used to do it. As with Birch and the bulk of ecotheologians, her concern is with the practicalities of applied ethics. Even though she briefly returned to her original theme in her closing remarks, her concern is still with the implications for humans,

> "… we can learn to de-centre humans long enough to focus on the animals' perspective… in learning to take a chimpanzee perspective, *we stand to learn more about human evolution and culture* (emphasis mine).[1013]"

And then, alas, the endnotes. My claim is that Howell's call to decentre humans as the focus of the God-world relationship is an essential step for theology to take. I therefore present another image, and explain why Christians ought to embrace it. I then describe the kind of mission the biocentric images in this thesis calls us to engage in, and what to make of Jesus in this context. Because so many of his followers contrast Jesus' teachings with the legacy of supposedly selfish evolution in which we developed, I look briefly at how a biocentric ethic might embrace both Christ's teachings and our evolutionary legacy. This is largely achieved by combining Jesus' focus on riches and poverty with the biocentric affirmation of the essential continuity of all species. Finally, ecology and evolutionary biology give us some clues as to where and how biocentric Christian communities might flourish, as well as a foundation for their ethics.

10.1 A biocentric vision

A biocentric theology treasures the richness of relationships experienced by *God* of and through life, a richness enhanced primarily by diversity not consciousness, and by community as much as individuality. It allows us, with God, to celebrate our inevitable extinction, without at all being *Homo*-phobic. Christian funerals have long been both an acknowledgment that we miss the one who is dead and a celebration of a life well lived. God's funeral for *Homo sapiens* may have much the same air, as it did for *H. neanderthalensis, erectus, ergaster, rudolfensis, habilis, floresiensis* and so on.

We have seen that we are a tiny tributary in the massive flow of life. We are a significant, but not central, collection of strands in an inconceivably massive and complex flow of relationships. I proposed that the pulsing flow of life is a better image of God than *H. sapiens* ever will be. I would now like to describe another metaphor which is grounded in water[1014].

Biocentric theology conceives this point in Earth history as a wave on the shore where God and creation meet. A wave of relationships[1015]. Ours was the biggest wave yet seen[1016], a boiling, foaming mass which raced up the shore after the dinosaurs went extinct. Now it is in retreat. How long until the next wave comes crashing in? How much of this wave will build the next, and how big will the

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[1012] Nancy Howell, "The Importance of Being Chimpanzees," *Theology and Science* 1, no. 2 (2003): p. 188.
[1013] Ibid: p. 189-90.
[1014] Pun intended. Anybody who has read this far deserves at least a little dry humour. Pun intended.
[1015] Conscious-telic devotees could see the wave as a wave of consciousness.
[1016] There were more species alive before humans developed agriculture than at any other point in history, though they add up to less than 1% of all species which ever lived.

next wave be? We do not know, and most likely we never will, as humans are not likely to be in the next wave. You and I certainly will not be. What we do know is that even if there is another large wave or two, the tide is definitely on the way out, and it will never come in again, on Earth at least.

Can we accept that we are but a tiny part of a wave of relationships on the shore where God and creation meet? Does this lead us inevitably into a kind of fatalistic world view in which, as mere parts of a wave beyond our control, we passively accept the rapid destruction of habitats and species around us? This God's eye view, this acceptance of evolutionary processes, including all its finitude and contingency, might raise the spectre of academics sitting in ivory towers, remote from the injustices of the world.

I believe that a workable ethic can be constructed which reflects the biocentric theology I have been promoting in this thesis. I begin by showing that, whatever our ignorance of the ultimate purposes of God, our own purposes drive us to be concerned about what happens to the rest of creation, based largely on the biophilia hypothesis I outlined in chapter 8.2.6[1017]. I then return to the God's eye view, expanding on the question of what it is that God values from the world. This allows us to begin to sketch an ethic which is rooted in biocentrism but still able to address the ethical concerns of those who care deeply for the Earth community, perhaps, I hope, in a somewhat more consistent and even more hopeful way.

10.2 Biocentrism: What's in it for humans?

The central commandment which Jesus left his followers, according to the synoptic gospels, was to love God[1018]. We are called to love God, not because God is some insecure despot who needs it, but because it is in this that we have life in abundance - eternal life[1019].

To *love* someone, we must *know* them, at least partially. The writers of the New Testament epistles urged people to know God, having found that this knowledge brought freedom[1020], wisdom, revelation and hope[1021], an end to exploitation[1022], and the ability to love[1023]. Not to mention the escape from the vengeance of God's wrath[1024]. To talk about God, to do theo-logy, we must believe that it is possible to know God, or at least something of God.

To know somebody, we need to know what they are like; we need an 'image' of them, a likeness. Even in our relationships with other humans, we do not have direct access to all they are. All we have is our image of them, the synthesis of who they really are and who we, from our past experiences and limited interchanges with them, imag(in)e them to be. The more time we spend with them, we hope, the better our image of them corresponds to reality. The better our image of them corresponds to reality, the more we know them. The more we know them, the more we can truly love them.

To know God, then, to love God, we need an image of God. This thesis has argued that the image of God we need to grasp is not *H. sapiens*, but life, past and future, on Earth and elsewhere. The richer

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[1017] Although my discussion will sound somewhat cold and rational, my own starting point, and doubtless of anyone trying to do ethics, is a passionate, emotional connection to life around me. Ultimately, I refrain from needlessly stepping on ants because something deep within me is horrified when life is callously discarded, not because of any logically thought out ethical position. Nevertheless, the complexities of such little decisions add up to the point where it is worth taking time to think through the ways in which the many competing claims upon someone who loves life might be balanced.
[1018] Matthew 22:37; Mark 12:30; Luke 10:27.
[1019] John 17:3. It is beyond the scope of this thesis to explore the extent to which this payoff was seen to be a present reality, or a future, post death reward.
[1020] Galatians 4:8.
[1021] Ephesians 1:17-18.
[1022] 1 Thessalonians 4:6.
[1023] 1 John 4:8.
[1024] 2 Thessalonians 1:8.

this image of God, the richer our knowledge of God and ability to love God. It is clearly an image we will only ever see a little of, but we must do what we can to see it. To paraphrase 1 John 4:20,

> "How can we say we love God, whom we cannot see, if we do not love the image of God, which we can see?"

Here Christian theology grounds itself in and expands the biophilia hypothesis we encountered in chapter 8.2.6. This was the idea that maintaining ecosystems similar to those of the Pleistocene, in which most of our brain evolution occurred, enhances our mental and emotional well being. For example, McDaniel, coming from the process tradition, argues that since we are indivisible from nature, we must cooperate with nature to nurture our selves[1025]. Thomas Berry claims that,

> "Our soul life is developed only in contact with these surrounding experiences… if this outer world is damaged, then the inner life of our souls is diminished proportionately.[1026]"

Rosemary Radford Ruether explicitly embraces the concept of biophilia. She argues that the degradation of the environment leads to a loss of "aesthetic imagination" which robs us of the moral urge to value life[1027]. It is not surprising to find such sentiment in those from the eco-engaged part of the Roman Catholic tradition, which has a long standing theology of creation as sacrament. This assumes that we can, through contemplating life around us, connect with the Creator of Life.

Edwards, for example, believes that, "… *Earth* reveals. It is the place of encounter with the Holy Spirit (emphasis mine).[1028]" In this encounter we engage God the uncontrollable Other, the Spirit who blows where it will[1029]. Yet this revelation is limited. Because he sees finitude as evil[1030], it follows that it cannot be part of the image of God[1031]. Elizabeth Johnson also limits the revelatory power of creation. For example, she explicitly denounces extinction as an evil which detracts from the sacramental potential of Earth,

> "… all diverse strands in the web of life are expressions of the creative power of the cosmos which is ultimately empowered by the Creator Spirit. The enormous diversity of species itself points to the inexhaustible richness of the Creator; whose imaginative goodness these species represent… when a species goes extinct we have lost a manifestation of the goodness of God.[1032]"

Zizioulas was another of the death denying theologians in chapter 9.3.2.1. For him, much of what we see in creation needs transforming; it is the *not-God* we must overcome. Zizioulas does not embrace the otherness of the rest of creation, but imagines that it will be changed to suit us, a paradise by human standards,

> "The Kingdom of God is not something that will displace material creation, but will *transfigure* it, *cleansing* it from those elements which bring about *corruption* and *death*.[1033]"

[1025] McDaniel, "Revisioning God and the Self," p. 236.
[1026] Thomas Berry, "Christianity's Role in the Earth Project," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), pp. 127-28.
[1027] Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*, p. 102.
[1028] Edwards, "For Your Immortal Spirit Is in All Things," pp. 65-66.
[1029] Ibid, p. 65.
[1030] Edwards, "Evolution and the Christian God," p. 188.
[1031] His thought shows some nuances on this matter, however, since, against Moltmann, he doubts that past species are really victims of evolution, nor that the death of a creature necessarily makes it a victim of its predator in a justice sense (Edwards, *The God of Evolution: A Trinitarian Theology*, p. 111-13).
[1032] Johnson, *Women, Earth, and Creator Spirit*, pp. 38-39.
[1033] Zizioulas, *Eucharist and kingdom of God, part III*, trans. Elizabeth A. Theokritoff, Sourozh, 60 (1995), 43-44. Cited, not seen, in Fox, "God's Shattering Otherness," p. 101.

Even the death affirming theologians like Radford Ruether, when they talk about the sacramental possibilities of creation, emphasise its positive aspects. God brings forth all things in *life-giving* interrelations, so that,

> "The whole creation must be seen as the bodying forth of the Word and Wisdom of God and as sacramentally present in all things.[1034]"

When we combine Radford Ruether's sacramental affirmation with other passages where she embraces finitude, we can adequately engage with Wilson. As cited on page 105, he reminds us that biophilia is not a romantic love of the pleasant parts of life, but an attachment to, immersion in, and participation in all of life, including the bits that make us fearful and anxious[1035]. The wild Other he reminds us about reveals to us God's shattering otherness[1036].

Keller's view of creation, for example, sacramentalises not Gilkey's God of order[1037], but the God of chaotic deep (Genesis 1:2),

> "For it is this complexity that is all too quickly perceived as chaotic and therefore as threatening, as mere disorder, as ugly, or as nothing. Therefore my project works from the bottom up -or rather, from the bottomless *tehom* up: to counteract the entire tradition of the demonization and erasure of chaos. [1038]"

Like Keller, David Tacey calls us to live with uncertainty, chaos and confusion, rather than rushing to neaten things up[1039]. He laments that,

> "… in our secular world the Other has lost its capital 'O' dimension and has become an 'other' human being, a lover, a friend, a husband or wife…[1040]"

Brady warns us that, "Shrinking from the otherness of land is the other side of shrinking from the otherness of God.[1041]" By denying that those parts of life we fear are sacramental, we have diminished the image of God. God has become like us, liking what we like. This is manifest in the extreme when we make the image of God *actually human*. By removing ourselves from everything fearful in life, everything wild, we have diminished our experience of the Otherness of God[1042], and thus limited our ability to love God.

Patricia Fox criticises our tendency to reduce both the God and non-humans to our image[1043]. As she points out, there are,

> "… profound implications of speech about God both for the future of life on this planet *and for the human person's capacity to know and relate to God* (emphasis mine).[1044]"

Seeing *life* as the image of God gives us a far richer, more beautiful, awesome, wonder filled, humble, yet robust faith foundation. The ultimate glimpse of this image incorporates the entire evolutionary

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[1034] Rosemary Radford Ruether, "Christian Anthropology and Gender: A Tribute to Jürgen Moltmann," in *The Future of Theology: Essays in Honour of Jürgen Moltmann*, ed. Miroslav Volf, Carmen Krieg, and Thomas Kucharz (Michigan: William B. Eerdmans, 1996), p. 251.
[1035] Wilson, "Biophilia and the Conservation Ethic," p. 31.
[1036] Fox, "God's Shattering Otherness." It is intriguing that Fox reaches this conclusion, since she is so affirming of Zizioulas' work.
[1037] Gilkey, *Nature, Reality and the Sacred*, p. 151.
[1038] Keller, "The Face of the Deep."
[1039] David J. Tacey, *Edge of the Sacred : Transformation in Australia* (Blackburn North, Vic.: HarperCollins, 1995), p. 195.
[1040] Ibid, p. 179.
[1041] Brady, "Called by the Land to Enter the Land," p. 40.
[1042] Shepard, "On Animal Friends," p. 292-93.
[1043] Fox, "God's Shattering Otherness," p. 99.
[1044] Ibid, p. 94.

history of life on Earth, and probably throughout the universe. It accepts even mass extinctions as, paradoxically, events by which the image is enhanced and enriched.

Yet few humans are able to engage with such an image, and even those of us who *can* struggle to hold it before us constantly. The image of God which is available to us is primarily the tiny part which we encounter every day, not the three billion to three trillion year old one we may intellectually believe in.

If we could immerse ourselves in even this tiny encounter with God in the day to day reality in which we live, our faith would be greatly enriched. Most rich humans now engage with wild animals through television. Yet is the lion, not the documentary about it, which reminds us that "It is a fearful thing to fall into the hands of the living God[1045]". The second most common sphere of interaction for the rich is the supermarket fridge, the stocking of which is a major cause of local extinctions.

Most humans, whether urban or rural, live in areas where non domestic animals are locally extinct, or confined to specific parks. In such parks, if they are dangerous they are caged, or the humans are forced to stay in their cars. Non dangerous animals are usually tamed, like the kangaroos that can be hand-fed, or the koalas that are prostituted out on a cash for cuddle (and photo) basis. Most humans, if we interact regularly with *any* other forms of life, do so only with pets. This was already becoming the case when the Hebrew Scriptures were being compiled. Although they refer to the occasional dangers from wild animals, the dominant paradigm for human interaction with other animals is agricultural. Christian theology has usually continued this paradigm unquestioningly,

> "The idea of responsibility for the animal kingdom as a whole is clearly neobiblical, especially "caretaking" and all its benevolent expressions. These are three: The Noah syndrome, which puts us in charge (as God's stewards) of *all* the animals; the hagiographic model of Saintly Hermit before whom the beasts, recognizing human holiness, gladly enter into cringing servitude; and the Peaceable Kingdom, the prototype of our perception and regulation of nature as if it were a nursery school playground.[1046]"

Belief in human stewardship is, according to Shepherd, a symptom of a biophobic culture. It reflects the desire for the world to be the way humans like it - safe, controlled and productive. The same could be said of the desire for a paradise of peaceable existence amongst animals, by which we really mean their control and domestication. According to Shepherd, humans as stewards or saints, and our peaceable eschatology, all reflect the projection of the domestic world onto nature. They,

> "… take wild animals one step closer to becoming slaves along with their domestic cousins. Wild animals are not our friends.[1047]"

I have participated in a number of Christian worship services where the value of the pet is extolled - they bring comfort to the elderly and sick, and they teach us something of God through their loving devotion to us. God loves us as faithfully as a puppy. Nice doG-God. Or their lack of intellect is used to show how hard it is for us to understand God's commands and plans for our life. We are to pets as God is to us. We, after all, are the image of God. Pets as both metaphor for divine love, and for divine control, work only because pets are little more than "flaccid slaves[1048]" compared to their nondomesticated ancestors. In heaven there is no room for the Wild Other[1049] who steals our babies from our tents, and who reminds us of the wild and untameable God who created us, the God of love and loyalty and pain and death.

[1045] Hebrews 10:31.
[1046] Shepard, "On Animal Friends," p. 288.
[1047] Ibid.
[1048] Ibid, pp. 282,87.
[1049] Ibid.

Domestic livestock, the other source of Vicar of Dibley-esque "animal services" are similarly pale reflections of wild animals. They are the Other bent into our image. Our experience of God is therefore deficient; because we interact with a McDonalds-ised God, a mutated and tamed God, a God who relies on us for its survival. As a result of such an impoverished, easily digestible diet, the "body of God" has become an obese couch potato.

So it is not enough to call people to love their pets, or be kind to their chickens[1050]. Such love is inherently patronising. It is not enough even to "love" wild animals or "nature". Biophilia was not, it must be remembered, only the *love* of life, it was the *engagement with* life,

> "… the paradox [is] that primal peoples kept their distance from animals- except for their in-takings as food and prototypes- and could therefore love them as sacred beings and respect them as other "peoples" while we, with the animals in our laps and our mechanised slaughterhouses, are less sure who they are and therefore who we are.[1051]"

Gebara points out that our religious symbols, like the lilies of the field and the breaking of bread, are no longer grounded in the daily reality we experience. This creates a deeply religious problem for those who continue to use these symbols to express their faith[1052]. We are out of touch with our symbols and the God they point us to, because we are out of touch with life in all its awesome abundance. We forget that it is indifferent to us, our desires, even our survival. We lack awe. A rich Christian spirituality needs, I believe, not patronising affection, but awe. As Paul Collins puts it,

> "… modern ecology is absolutely central to the future of religion… Christianity specifically will gradually cease to exist if the natural world continues to be devastated at the present rate. There is a deep and dependent inter-relationship between the development of religious attitudes and the sustainment of the natural world… human beings, living in a feed-lot world where all wilderness has been destroyed… will slowly lose touch with the possibility of the development of culture, art, religion, and spirituality… we human beings will simply shrivel up spiritually and lose our ability to perceive and experience the deeper issues that give meaning to our lives and the transcendent reality that stands behind the natural world and all that is…[1053]"

I have engaged in a fairly sustained consideration of the biophilia hypothesis, and its theological extension which affirms Earth as sacrament. If used to truly affirm the Wild Other, it further grounds us in the need to engage with life as a whole as the image of God, and reminds us of those parts of the Christian tradition that point us to the wild God beyond us. Yet this sacramentalist view does not feature in the Uniting Church resources I considered in chapter 6[1054].

As we saw in chapter 6.2.4, Uniting Church engagement with creation focuses on seeking justice for creation, based on the declaration that the rest of creation is good in itself, *apart* for its usefulness to humans. The appeal to preserve biodiversity, then, is not couched in biophilic or sacramental terms,

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[1050] Though having chickens in the first place would be a big advance on buying their eggs from the shop. And battery farming should be abolished immediately, in my opinion, but for the chicken's sake - it wont bring us closer to the Wild Other.

[1051] Shepard, "On Animal Friends," p. 289.

[1052] Gebara, *Longing for Running Water*, p. 197.

[1053] Paul Collins, *God's Earth : Religion as If Matter Really Mattered* (North Blackburn, Vic.: Dove, 1995), pp. 3-4.

[1054] The one exception proves the rule, since it comes from an Anglican employed to lecture in a Uniting Church college in Adelaide. It appears in a chapter on the nuclear energy cycle produced for the Assembly in 2000, "Thus the creation is *sacramental*, being a visible and tangible sign of the invisible and intangible reality of God. Any diminishment of creation, such as the accelerated loss of species, is a diminishment in our perception of the Creator." (Balabanski, "Theological Foundations for Considering the Uranium Mining/Nuclear Fuel Cycle.")

> "Why does it matter if an insect, a plant, or a bird disappears forever? It matters because each one is a creature who belongs to God. It matters because whenever the diversity of life is reduced the world becomes a poorer place.[1055]"

The problem of the world becoming a "poorer place" has nothing to do with its sacramental usefulness to humans, or our biophilic needs. It matters because it matters to *God*. Even when creation is said to be eucharistic, as we saw in chapter 6.2.5, the emphasis was on God's blessing *to creation* through the eucharist, not the human ability to encounter God through it.

This emphasis on the value of creation for itself and for God is a corrective to the anthropocentric, utilitarian tendencies in sacramental theology identified by McFague[1056]. Biophilic sacramental theology focuses on what creation can do for Christians, and how we can thus best preserve our own interests. The Uniting Church dares call its members to a more presumptuous task.

10.3 Biocentric mission

As we saw in chapter 7.2, the *Basis of Union* commits members of the Uniting Church to the formidable task of discerning the will of God. It assures us that, through an informed faith, we can know something of God's ways. We will, it assures us, learn more of the will and purpose of God through contact with contemporary thought, including the sciences. Through relating to those outside the church we can better understand our nature and mission[1057].

What is our mission? Why are we here? Why is there something rather than nothing[1058]? In the section on biocentric process theology[1059] I argued that life is here to live, to give God an other to relate to, in order to allow God to change. I want to briefly develop that idea further. If God's desire is for richness of experience, primarily mediated through relationships, if that was God's "mission" in creating or relating to the universe, then Christian mission should be to enhance the richness of experience of God[1060].

Here we go beyond what the science story can tell us, claiming that that the good is that which maximises God's experience. Yet experiences can be ambiguous, for us at least. We do not ourselves value *all* experiences. Sex, for example, may be experienced as a moment of love and intimacy, or brutality and violation. The dying process can be a peaceful, welcomed one, or a terrifying assault to be desperately resisted.

Informed by ecofeminism we might imagine that God affirms in general the experiences of death and pain, tragedy and suffering, but not all of them specifically. Even a specific instance of joy might not be automatically affirmed if it comes at great cost to others, and therefore at great cost to God[1061]. So we will need to make judgments about what sort of experiences God values. Whilst admitting the folly

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[1055] Assembly Social Responsibility and Justice Committee, "Healing the Earth," p. 15.
[1056] McFague, *The Body of God : An Ecological Theology*, pp. 183ff.
[1057] Uniting Church in Australia, *Basis of Union*, section 11.
[1058] Most Christian theology, in the west at least, subscribes to the doctrine of creation *ex nihilo*, that without God's action there would have been no creation. Catherine Keller (Keller, *Face of the Deep*.) argues persuasively that this is not the biblical world view, and should not be our world view, recalling Genesis 1:2, where the Spirit of God broods over the *pre-existing* deep. She still assumes that God *did something* through which the deep brought forth life as we know, so we can still ask the question, why?
[1059] Chapter 9.5, page 172.
[1060] Lucy Larkin promotes this idea, from a slightly different perspective (Larkin, "The Relationship Quilt," p. 157.)
[1061] A number of theologians emphasise the obvious flip side of God experiencing life through life - that when life suffers, so must God. Eg Edwards, "For Your Immortal Spirit Is in All Things," p. 64, Korsmeyer, *Evolution and Eden*, p. 94, McFague, *The Body of God : An Ecological Theology*, p. 176, Rainbow Spirit Elders, *Rainbow Spirit Theology : Towards an Australian Aboriginal Theology*, p. 67. Others limit God's suffering to the experience of the cross , eg (Peters, *Science, Theology and Ethics*, p. 242.)

of trying to read the mind of the God of the universe, we don't seem to have any alternative if we wish to do something rather than nothing.

And here the Christian claim that in Jesus of Nazareth we see something of God's communication to humans gives us a little more confidence in our endeavour. Here then is another assumption which we cannot claim to justify from the science story; that the story of Jesus in some way reveals something of the divine will, for *H. sapiens* at least. At a bare *minimum* the Christian claim is that in Jesus we see a special divine communication to humans about how we should be in the world. Alongside the Genesis tradition of humans being created in the image of God lays the New Testament claim that amongst humans, Jesus is in some way a unique image of God, indeed *the* image of the invisible God[1062]. This includes both the sense of Jesus having a unique relationship to God as the firstborn (most important) of all creation[1063], and also being the likeness of God, the latter especially in the gospels[1064].

So Christians have two images of God: the billions of years old pulse of life, and the historical man Jesus of Nazareth, who lived for approximately thirty years, two thousand years ago. What might the first image contribute to our understanding of the second image? What does it mean to say that Jesus is the unique human image of God, and is that actually tenable anymore?

10.4 Jesus the image of God

To claim that Jesus was the unique human image of God says little in some respects. Arianism, Adoptionism and a number of other famous heresies would happily make that affirmation. Classical liberalism, exemplified most publicly by Samuel Angus[1065] and Ted Noffs[1066] in the pre-uniting churches, accepted that Jesus appeared to be the unique human image of God, but claimed that in principle anybody who opened themselves to God could also be that image, since we were all of the same substance as Christ.

The majority Christian tradition, however, emphasises that Jesus of Nazareth not only *was* a unique image of God, but necessarily *is* unique. No human can win the possession of that image through their own efforts. We cannot become a child of God directly, but only through Jesus, the unique child of God. This coheres well with my rejection of consciousness-telism, which is implicit in liberal theology for example. If it is through our own conscious efforts to transcend ourselves that we may also become the image of God, then many humans, and most animals, are excluded.

Biology opens up a fantastic alternative[1067]. Perhaps Jesus had a genetic mutation, which gave him the ability to perceive God's constant communication with the world more fully than the rest of us. Some animals can see the infra-red, ultra-violet, and even ultra-sonic worlds, and Jesus could literally 'see' God. Since Jesus did not breed[1068], the ability perished. He was then, the unique image of God in a way we cannot hope by our own efforts to replicate. Of course, we would expect the mutation to repeat from time to time. In the right environment, this mutation may again lead to a manifestation of this unique relationship with God. This line of thinking holds potential for those who want to affirm the autonomy of other faiths, though I expect the idea that Jesus, Buddha and others shared a common genetic mutation is too bizarre to ever be pursued.

The majority Christian tradition affirms not only that Jesus was unique, but that he was unique *because of the action of God*. Jesus was not just a man who lived uniquely well or a genetic freak; but the

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[1062] Colossians 1:15, 2 Corinthians 4:4.
[1063] Colossians 1:15.
[1064] For a brief summary of some of the key texts see http://www.bible.ca/ef/expository-colossians-1-15.htm
[1065] Ian Breward, "Christianity Must Be Reinterpreted; Samuel Angus' Response to a Secular Society and a Traditional Church," *Trinity Occasional Papers* 4, no. 1 (1985): p. 27.
[1066] Ted Noffs, *By What Authority?* (Methuen, 1979), pp. 28-31.
[1067] Literally fantastic, not necessarily good.
[1068] A tiny minority believe that he did. However, his life suggests that enhanced communication with God is strongly linked to increased mortality, so we would not expect the mutation to persist for long.

fusion of the fullness of God and fullness of humanity in a single individual. This image can only be repeated if God wills it to be[1069]. Jesus was the image of God, then, because God intervened in the biological world to make it so.

The interesting question in this thesis is *to whom does Jesus image God*?

Eco-engaged theology, in its desire to value all creation, often claims that Jesus came to bring salvation or redemption not just to humans, but to everything[1070]. A key strategy in affirming all creation is to link it to the incarnation. Jesus is not just human, but flesh. This is a major emphasis of McFague's body of God metaphor[1071], and in chapter 6.2.13 I showed that Bos and James took this approach. John Davis, when a candidate for ministry in the Uniting Church engaged in a sustained argument for this way of thinking. For Davis, "humanity is merely incidental to the incarnation," and the fact that,

> "…the grace of God was imminent in creation before human existence, and will continue beyond human existence, necessitates an attitude towards the cosmos which cannot be anthropocentric.[1072]"

Not only that, but the incarnation, the centre of Christian faith,

> "…can not be construed as anthropocentric or androcentric. God gave God's self to *creation* (emphasis mine).[1073]"

Gebara agrees that all creation is caught up in the saving work of Christ, begun in the incarnation and testified by the resurrection,

> "… it is *the earth* that is both the subject and the object of salvation. We need to abandon a merely anthropocentric Christianity and open ourselves up to *a more biocentric understanding of salvation*. To Jesus' humanistic perspective, we need to add an ecological perspective. This new way of doing things seems to me perfectly justified, because it maintains not only the most fundamental aspects of Jesus' perspective, but also the understanding that we are a living body in constant evolution (emphasis mine).[1074]"

Though Davis and Gebara explicitly reject anthropocentrism, the attempt to include Earth in salvation actually works best when grounded in the anthropocentric tradition, which sees Jesus the Christ, the

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[1069] This to, of course, opens the door to religious pluralism.

[1070] This is not a novel invention of modern ecotheology. Celtic Christianity explicitly included all creation in redemption (Santmire, *Nature Reborn : The Ecological and Cosmic Promise of Christian Theology*, pp. 112-13.) Wesley expected the general deliverance of all creatures, based on God's love for them, a sensitivity to their undeserved suffering in this life. This reasoning dated back to Paul's reflections on creation in Romans 8 (Wesley, *Collected Sermons of John Wesley from the 1872 Edition*.) This sermon was not included in the collection of 44 sermons, according to the list provided at http://wesley.nnu.edu/sermons/standards.htm. A few modern examples, apart from those about to be cited specifically in the text, include Grimbaldeston, "Sophia Renewing Earth," p. 21, Habel, *Resource Manual for a Season of Creation,* John Habgood, "A Sacramental Approach to Environmental Issues," in *Liberating Life : Contemporary Approaches to Ecological Theology*, ed. Charles Birch, William R. Eakin, and Jay B. McDaniel (Maryknoll, NY: Orbis Books, 1990), p. 52, Hosinski, "How Does God's Providential Care Extend to Animals?," p. 143, Elizabeth Johnson, "Losing and Finding Creation in the Christian Tradition," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. 15, George Kehm, "The New Story: Redemption as Fulfillment of Creation," in *After Nature's Revolt : Eco-Justice and Theology*, ed. Dieter T. Hessel (Minneapolis: Fortress Press, 1992), p. 89.

[1071] McFague, *The Body of God : An Ecological Theology*.

[1072] John Davis, "Christology and Ecology : A New Perspective," *Colloquium* 27 (1995): p. 47.

[1073] Ibid: p. 45.

[1074] Gebara, *Longing for Running Water*, p. 183.

God-human, as the second Adam, the one sent to save us from the consequences of the Fall[1075]. This is a tradition which grounds itself squarely in the Pauline reflections on the relationship between Adam and Christ,

> "For since death came through a human being, the resurrection of the dead has also come through a human being; for as all die in Adam, so all will be made alive in Christ.[1076]"

> "Therefore, just as sin came into the world through one man, and death came through sin, and so death spread to all because all have sinned…[1077]"

Yet creation is not spiritually fallen, and finitude is not a consequence of a Fall. Finitude is good. What sense can we make of the idea that Jesus saves creation? From what does he save it, if not pain and death? I believe that Jesus' role in creation must be thought of as a secondary one, resulting from his role amongst human beings. Having stressed that God's relationship with creation is a direct one, not mediated by God's relationship with humans, I will now argue that the event which Jesus of Nazareth represents *is* in the first instance a God-human story. Jesus as God-human, ironically, preserves a biocentric worldview better than the idea that Jesus is God-flesh. Jesus is only directly the Christ for humans.

Edwards, though hardly a biocentric theologian overall, provides a way of conceiving the link between Jesus and humans in the context of the relationship between God and creation,

> "..if Jesus Christ can be thought of as the human face of God in our midst, the Spirit can be thought of as God present in countless ways that are far beyond the limits of the human…. God is given to us in a personal presence that exceeds all human limits.[1078]"

So Jesus came for humans, to save us. Does this offer of salvation call us into, or out of the evolutionary story? To participate in or overcome it?[1079] What do we need to be saved from in the first place, or what do we need to have revealed to us? Are the consequences of this salvation or revelation limited to humans, or do they flow on to the rest of creation in a secondary sense? What does it mean to be saved amidst the affirmation of our individual death and communal extinction? And is there any hope that our attempts to live out our salvation, or the revelation we have received, might succeed?

The emphasis in ecotheology that Jesus did not come to save us *out* of the world could still be true even if it no longer makes sense to say that he came to save us *with* the world. But if he has not come to save us from the Fall, or even from the finitude which we traditionally took as evidence for it, then what has he come to save us from, and why?

One possible answer is that he came to save us from the *fear* of finitude, or at least being controlled by that fear to the extent that we no participate in life. If we do not participate fully in life, we have impoverished relationships, and so God's relationship with life is diminished. Jesus may be different

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[1075] The documentation of the development of the doctrines of Original Sin and the Fall is undertaken extensively by Wiley (Wiley, *Original Sin- Origins, Developments and Contemporary Meanings*.) and Korsmeyer (Korsmeyer, *Evolution and Eden*.).

[1076] 1 Corinthians 15:21-22, NRSV translation.

[1077] Romans 5:12, NRSV translation. Crucially, the italicized text was long mistranslated as "in whom," which had a major impact on the development of the doctrine of original sin. See Wiley for more on the mistranslation (Wiley, *Original Sin-Origins, Developments and Contemporary Meanings*, pp. 51-52.) She examines the uses of this verse in Christian history throughout her book.

[1078] Edwards, "For Your Immortal Spirit Is in All Things," p. 65. His reflections on the possibility of multiple incarnations if there are multiple intelligences throughout the universe supports the limitation of Jesus of Nazareth's person and work to humans.

[1079] We hear the echoes of Richard Niebuhr's classic (H. Richard Niebuhr, *Christ and Culture*, [1st] ed. (New York,: Harper, 1951).)

not in being "perfect" (a notion with little ecological or evolutionary meaning), but in accepting death, even violent death, so as to enter into life. Certainly his challenge to those who would follow him, as we have it recorded in the gospels, frequently refers to the need to accept finitude in order to participate in eternal life, especially finitude deliberately inflicted by others[1080]. Yet his was not a morbid life. He did not pursue finitude but he did not hide from it either. This enabled him to embrace life in all its fullness, and that is what he offered to those who came to know God through him.

Jesus' mission would then be to call humans to embrace our finitude in order to participate in life, to have full relationships which God can vicariously enjoy, and to have a full, direct relationship with God. In other words, Jesus came to call us back into the evolutionary story of life.

Of course, fear of finitude is not always a bad thing. It is perfectly reasonable and highly adaptive to be afraid when harm is an immediate possibility. It would never have evolved otherwise. The fear which requires salvation is the chronic, overwhelming, fear of finitude which prevents us engaging fully with life, and causes us to inflict harm on others in order to hide from it. This level of chronic fear is only possible for those who are conscious, probably even self conscious; so we would expect the potential for it to have slowly grown over the last few million years, amongst primates and possibly cetaceans.

If the potential for this chronic fear has existed for millions of years, why did God leave the incarnation so long? Just because the biological potential existed does not mean that it actually occurred. Human brains have changed little in over 100,000 years, yet what we think about has changed enormously. This chronic fear of finitude may be a relatively recent event. It is not even clear that this fear is a problem for all humans today, a point I will elaborate on in chapter 10.6. For now, though, I want to consider why God intervened in human history at all- why did God become one with our human flesh?

For one thing, Jesus came for humanity's sake. Jesus' central message as recorded and expounded by his earliest followers was that God loves humans. This is what gives us the confidence to embrace our finitude. How it gives us this confidence might be along the lines proposed by Clark. She argued that what we primarily fear is the lack of either bonding or autonomy. Since they pull us emotionally in different directions, we need to be able to make sense, or meaning, of our inability to have both. If this is missing, or if we simply lack one or the other outright, then our finitude overwhelms us. Belief in God and the great biocentric story of the universe might answer the need for meaning, as we balance our sense of bonding and autonomy not only from each other, but from the other creatures around us, indeed from God. Perhaps the fear of finitude is greatest when we think it will make us overly dependent on others, or abandoned by them.

Equally, for the sake of other creatures. If we see current human action as mostly evil, then Jesus came for the sake of those creatures whose habitats are being destroyed as we seek immortality, or at least distraction, through consumption and control. He becomes the Jonah sent to warn humans of the consequences of our godless ways, or the Lorax who speaks for the trees[1081]. Here we reconnect again with the vast body of ecotheology which, for whatever reasons, calls on us to limit our consumption of resources in order to make more available to the rest of life on Earth. God acts to save creation, not by changing its nature but by limiting the ecological impact of humans within nature. God does not need to save other creatures form the fear of finitude, it usually only concerns them when it needs to[1082]. Animals are saved in a secondary sense, from the unnecessarily prolonged fear of finitude imposed on them by fearful human systems. For example, the domestic livestock who are crammed into slaughter

[1080] Of the numerous examples in each gospel, see for example Matthew 5:10-12; Mark 10:29-31; Luke 14:25ff; John 12:24-25.
[1081] "My name is the Lorax, I speak for the Trees. I speak for the trees since the trees have no tongues..." Theodor Seuss Geisel (Dr Seuss), *The Lorax* (not stated: Random House Books for Young Readers, 1971).
[1082] Peacocke, "The Challenge and Stimulus of the Epic of Evolution to Theology," p. 101.

yards, trembling fearfully amidst the sounds and smells of death which they know intuitively spell danger for them[1083].

If we see the human mediated extinction as good, then we might imagine that God intervenes for the sake of those who will profit when we embrace our eventual extinction, and we hear especially Jesus' calls to renounce our lives in order to participate in eternal life. To lay down our (species') life for those friends yet to come.

Finally, perhaps pre-eminently, God did it for God, whose experience of life includes the vicarious experience of life through creatures, and who would thus experience less fear and more joy if we escape or at least minimise our fears.

This line of thinking obviously implies that the incarnation of God in Jesus of Nazareth may not have happened, something which Christians have disagreed on through the ages. Had humans not fallen into chronic fear, there would be nothing to save them from, thus the incarnation depends on human action, not God's completely free initiative. One response is that there is nothing to stop the incarnation happening for a different reason, just because God felt like it. In the wider context, though, I have already argued that the evolution of humans in the first place was highly contingent. Had a few things gone differently the most self-conscious species on the planet may not even be mammalian. There may not even *be* a self conscious species. Since human evolution is contingent, so must be the birth of Jesus of Nazareth, and thus the *specific* incarnation which launched Christianity.

It did not need to occur, but Christians claim it did. I suggested above that it represented God calling humans back into the evolutionary story of finitude and contingency. Yet this is not a common view even in ecotheology. Christianity is often seen to be a fight against our "selfish" evolutionary history, a counter-evolutionary force. As examples of this thinking I will consider the ethical visions of Sallie McFague and Rosemary Radford Ruether. I focus on them because of their undeniable influence in the field of ecotheology and ethics[1084]. McFague has quite an ambiguous view of death. Radford Ruether, like a number of other ecofeminists, is unreservedly affirming. But both seem to envisage the ethical project as something counter to the evolutionary history of Earth. I will try to show that their fundamental concerns for justice can be addressed *within* an evolutionary framework, and then speculate as to where we might expect these ethical systems to actually *work*.

10.5 Jesus against evolution?

In chapter 8.2.5 I decided in favour of the Darwin/de Waal understanding of the evolution of ethics over against the Huxley/Dawkins one, where evolution is seen to be a selfish process, creating instinctively selfish creatures. It is the latter framework which dominates popular thinking, and not surprisingly theological responses to the theory of evolution tend to respond to this view of evolution and morality. So, within the Uniting Church we have Professor Rod Rogers, a biologist, who argues that,

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[1083] I believe that slaughter houses are not only economically efficient, but they are popular because they shelter most of us from the reality of death. We cannot even kill our dogs, but have them "put to sleep." Professionals in hospitals, hospices, funeral homes and crematoriums take care of death for most westerners.

[1084] McFague's Earth as body of God model, for example, is widely used in eco-engaged theology up to the present, e.g. Birch, "The Liberation of Nature," p. 6, Halkes, *New Creation : Christian Feminism and the Renewal of the Earth*, p. 154, Lorna Hallahan, "Embracing Unloveliness: Exploring Theology from the Dungheap," ed. Denis Edwards (Minnesota: Liturgical Press, 2001), p. 113, McDaniel, "Revisioning God and the Self," pp. 247-48. Through the participation of people like McFague and Birch in the Annecy gathering, this model was incorporated into the very influential *Liberating Life* report to the World Council of Churches (Participants in the WCC Annecy Gathering, "Liberating Life," p. 279.). Radford Ruether coedited a recent major work on ecotheology (Dieter T. Hessel and Rosemary Radford Ruether, eds., *Christianity and Ecology : Seeking the Well-Being of Earth and Humans* (Cambridge, Mass: Harvard Univ Pr, 2000).). She is widely cited in eco-engaged literature, and perhaps best known for her book *Gaia and God* (Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*.)

> "… we are born selfish, selfishness has shaped us to the point where we have the intellectual facility to recognise selfishness and escape from it.[1085]"

Charles Birch initially sounds like he has escaped this trap when he recognises that,

> "Neither our nature nor culture is bad… It is too easy for us to say we are victims of our genes or victims of our environment.[1086]"

Yet his main thrust, relying on Huxley, is that our nature is indeed selfish, and we need to, "… *outfox what evolution has led us to* (emphasis mine).[1087]" Theologically, Birch criticises the version of Original Sin which he traces from Augustine through Luther and Calvin. He shows how it parallels the notion of genetically embedded selfishness. He also correctly contrasts Augustine with Pelagius, whom he seems to favour. It would seem logical, then, for him to rely on Darwin and Frans de Waal, rather than Huxley and Dawkins for his scientific explanation of the links between genes and temperament. Since de Waal is not mentioned by Birch it appears that he was, unfortunately, unaware of his work, and thus a more satisfying and scientifically correct vision for ethics. When McFague and Radford Ruether claim that Jesus' ethic is counter-evolutionary, then, they stand within the theological majority.

McFague's misunderstanding of the nature of the evolutionary process is revealed when she claims that we can *counter* natural selection with the principle of solidarity[1088]. As a result, "… the physically challenged are not necessarily *cast aside* as they would be if only genetic selection were operative.[1089]" She believes that we have replaced biological with cultural evolution, where we can prioritise a desire for all life forms to share the basic good of the planet. This, "solidarity of each with all" is, she believes, counter to the workings of natural selection or the survival of the fittest[1090]. Because she is ambivalent about death, she wrestles with the possibilities for justice in a world of natural selection[1091], which leads as she sees it to the *natural evil* of death and suffering.

We need to correct the idea that anything can *counter* natural selection. It will always occur. Solidarity is a practice which natural selection "judges" according to its biological consequences, it is not something which can operate "against" natural selection. Clark has explained how individuals who practiced reciprocal solidarity with others in their small group were selected for during the ice ages in our recent history[1092].

The contrasting of solidarity with survival of the fittest also reflects a common misunderstanding of that unfortunate term[1093]. The "fittest" are not to be contrasted with the "weakest", like the physically challenged McFague mentions. The "fittest" are those who best fit their environment, measured by the extent to which they survive to breed, and/or care for offspring who share their genes. The unit of selection is not even so much the individual as their genes. Genetic selection does not "cast aside" the physically challenged, but if there is a genetic basis for their condition, and if it is severe enough to prevent any carriers of the gene from breeding, and from caring for others who are otherwise closely

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[1085] Rogers, "Evolution," p. 63.
[1086] Birch, *Biology and the Riddle of Life*, p. 87. This concludes a lengthy section on the issue, which started on page 78.
[1087] Ibid, p. 80.
[1088] McFague, *The Body of God : An Ecological Theology*, p. 171.
[1089] Ibid.
[1090] Ibid, p. 172.
[1091] Ibid, pp. 170ff.
[1092] Clark, *In Search of Human Nature*, pp. 107-25.
[1093] Frans Roes, *I Had the Future Exactly Wrong. Interview with Robert Trivers* [internet] (1995 [accessed 1 July 2004]), available from http://www.froes.dds.nl/TRIVERS.htm. Segundo is another Christian theologian who, in an extended discussion of natural selection and evolution, gets the concepts and its implications almost completely wrong, concluding, "… what relation could the human search for meaning and the Kingdom of God preached by Jesus have with a universe which, in the struggle to the death, selects 'the fittest' to survive?" (Juan Luis Segundo and John Drury, *An Evolutionary Approach to Jesus of Nazareth*, ed. Juan Luis Segundo, *Jesus of Nazareth, Yesterday and Today ; V. 5* (Maryknoll, N.Y.: Orbis Books, 1988), pp. 50-61.)

genetically related, then selection will tend not to favour the ongoing survival of the genes that code for it.

In claiming that Christianity is counter cultural when it promotes the inclusion of the excluded and weak, we need to remember that McFague is writing primarily against western industrial cultures. Such cultures do indeed marginalise and cast aside, *and* they could afford not to. It has been shown, however, that in other less technological cultures, with smaller numbers, where people know each other, there is a strong tendency to care for the injured to a point. This predates *H. sapiens* - it is known that Neanderthals took care of their sick and injured[1094], as do other primates. Indeed, many social vertebrates tend to do so, within their means. Elephants, for example, have strong social bonds and display high levels of altruism[1095]. There are limits, even in human societies, and the limit generally appears to be about survival. Infanticide, for example, was necessary for survival in Australian nomadic communities in times of scarcity[1096], as mothers adjust their maternal effort to their circumstances[1097].

Is that, we might ask, really an evil? Are individuals in such circumstances really called to lay down their life in the place of the frail elderly, or the infant? Is it really unfair that some are left to die, if all have an equal chance of being that somebody? The more death affirming ecofeminists like Radford Ruether might say no.

Ruether embraces death and pain and suffering; but rejects their unequal and therefore unjust distribution. It is not that people die that is evil, but that some people, in trying to deny their finitude, construct systems of domination and distortion[1098] which make others suffer and die more quickly than they ought,

> "Sexism and *all forms of exploitative domination* are thus not parts of the image of God, but forms of sin.[1099]"

This is a compelling vision of human communities. If the image of God is confined to *H. sapiens*, this statement may provide a practical ethical starting point. It calls people to share resources so that all have an equal chance at a fulfilled life, even though that life will involve pain, and one day come to an end. But if the image of God is *life*, and humans are part of the evolutionary process, we seem to face a major dilemma.

For a central claim, if not *the* central claim, of evolutionary biology is that it is the *unequal* distribution of resources, the *shortage* of resources, and the differential successes of organisms in exploiting them, that makes some individuals more likely to survive, and thus fuels natural selection. Only by claiming that human biological evolution has stopped can we claim that the unequal sharing of resources is fundamentally evil, and then only for humans. Only an ecology divorced from evolution can imagine that a good world is one in which all creatures have enough. Yet even then we would need to acknowledge that exploitation is an essential part of ecology, and a major component of many ecological relationships. Life forms use life forms. Parasitism is a major life strategy. Every organism relies on, and often precipitates, the pain, death and even suffering of others in order to survive.

[1094] Zimmer, *Evolution*, p. 300.; Sarah Hrdy, *The Past, the Present, and Future of the Human Family* [internet] (2001 [accessed 6 October 2004]), available from http://www.tannerlectures.utah.edu/lectures/Hrdy_02.pdf.
[1095] Caroline Moseley, *Numbers: Not the Whole Story* (1999), available from http://www.princeton.edu/pr/pwb/99/0329/elephants.htm.
[1096] Anonymous, *Aboriginal Culture for Health Workers. Episode 33.* [internet] (c2004 [accessed 6 October 2004]), available from http://www.medicineau.net.au/AbHealth/33.HTM.
[1097] Hrdy, *The Past, the Present, and Future of the Human Family*. Hrdy points out that the more support the mother has from others in her group, the less likely abandonment will be.
[1098] Ruether, "Ecofeminism: The Challenge to Theology," pp. 105-06.
[1099] Ruether, "The Future of Theology," p. 251.

What we might affirm is that evolution proceeds, and thus ultimately God's richness of experience is enriched, when *all* organisms are subject to exploitation (use by others). Many organisms use technology to attempt to maximize their resource exploitation and minimize their chances of being exploited[1100], but most of these technologies have very limited effectiveness. Some humans, however, have managed through technology to greatly increase their exploitative potential, whilst insulating themselves from being exploited, including delaying their deaths through various technologies. Even when they do die, some hide deep in the ground in coffins, thus denying the soil microbes, and thus the trees and animals, access to their bodily resources for decades, or even permanently. Cremation is even worse - destroying many useful organic materials and consuming vast amounts of energy[1101]. An expression of sin, then, might be the removing of the self from the cycle of exploitation on which life, and thus God, depends.

As for domination, ecologists often talk of dominant species, those whose activity in a particular ecosystem has a major impact on other species, larger than their numbers would lead us to predict. On ecological time scales, such species sometimes sow the seeds of their own destruction, by manipulating their environment to the extent that they are no longer suited to it. On evolutionary time scales, the demise of dominators is often due to external factors. So again, a rich image of God, over a long enough time scale, requires domination, but also requires the dominance of any one species to be ephemeral. Sin, then, may be use of technology to block this ephemerality.

So Radford Ruether says that individuals must embrace their finitude, and justice is achieved when we share equally in that experience. Since finitude often results from the actions of others, I am proposing that justice is an *equal sharing* in the experience of being exploited and dominated, rather than escaping the experience altogether. This does not mean that we expect people to have an exploitative and dominating *attitude*. Rather, natural selection will "choose" between individuals and communities based on the extent to which their attitudes lead them to effectively exploit and dominate the resources around them. Some communities will choose to care for their sick and old, others will not. Some will be highly individualistic, others very communal. None of these strategies oppose natural selection, all will be "evaluated" by natural selection, according to which aid the survival of the community in their environment, and ability to respond to changes in that environment as they occur.

Yet we know that evolution proceeds in a somewhat punctuated way. It is during times of massive environmental flux, especially when populations are isolated from each other, that the most rapid evolution occurs. Here technology creates a paradox. On the one hand, the use of human technologies produced massive changes in ecological conditions. On the other hand human technology allows those who possess it to survive these same changes, at least for several generations. Technology buffers actions from consequences. Secondly, while technology allows humans to travel the globe and thus reduces cultural and biological isolation, there is an increasing gap between those who have and do not have access to technology, which effectively produces class based, rather than geography based isolation[1102].

Of the many things I could attempt to engage with at this point, I want to highlight the heterogeneity within the species *Homo sapiens*, based not on genetics, but access to technology. This leads to a biocentric ethic which fits within, rather than standing against, our evolutionary heritage, and which avoids the widespread slide from biocentric theology to anthropocentric ethics.

[1100] For example apes use sticks to remove termites from mounds, thus increasing their ability to exploit the termites. Many creatures construct nests and even stone shelters to reduce their chances of being exploited by others for food.

[1101] When I did my postgraduate diploma in environmental studies one of the masters students was measuring the relative environmental impact of different methods of human body disposal. She told me that cremation was easily the worst, and shallow burial, naked or in cotton clothes easily the best. If you choose the latter, it is worth including a non-biodegradable note with which to allay the concerns of police.

[1102] Reproductive isolation is a major catalyst for speciation. Overlaid on this is the relative freedom of cultural ideas and behaviours from genetics, and the rapid evolution of these elements (popularly referred to as memes) across biologically stable human populations.

10.6 Jesus' ethic: "human *versus* creation" to "rich *versus* poor"

In order to ground ecotheology in a central message of Christ, McFague attempts to reimagine nature as the new poor[1103]. She also points out that the human species contains within it both rich and poor people[1104]. Despite this, she maintains a clear distinction between the human and non-human poor, so her ethic remains determinedly anthropocentric[1105] despite her claims to the contrary. She criticises deep ecologists for claiming that humans are but one species amongst many, and is emphatic that, "… *our own species* must be first in consideration and importance (emphasis mine).[1106]" She goes on to contrast the plight of a starving human child with starving animals, and argues that unless we uphold the needs of the child we are widening the gulf between social and environmental activism[1107].

Ecologically, it is not simply membership of *Homo sapiens* which dictates one's impact on the systems of Earth. It is not differences amongst humans in their genetic makeup which determines their ecological relationships, but differences in their access to and use of technology. It is technology which allows some humans to be such effective dominators and exploiters, and escape the consequences in the short term. History suggests that few human civilisations persist for more than a few hundred years once they develop technology[1108], and that their neighbours which are put in range by that technology persist for even less time[1109].

It is not the extinction of *H. sapiens*, then, which is actually the most ecologically significant event in the future, it is the removal of the technology which enables some to be so resource rich. At this point in our evolutionary story, this category includes *only* humans but it does not include *all* humans.

Not all humans are technologically or ecologically equal. The agencies of the Uniting Church which deal with humans have repeatedly called attention to, and sought to redress, the widening gap between rich and poor, oppressive and oppressed, in Australia and the world[1110]. Uniting Church ecotheology, however, speaks of humans as an all inclusive "we," and thus loses much of its prophetic potential. To lump an oppressed Indigenous population in with its oppressors, or landless peasants in the Philippines with Bill Gates, has no defensible basis now that we have rejected the ontological distinction between humans and other animals. When we combine the critique of wealth with the critique of anthropocentrism we are better placed to approach ethics biocentrically. Even if McFague is right, and Jesus had little direct concern for the plight of non humans[1111], his teaching still has much to say to his followers today, given his preoccupation with critiquing wealth and power, and those who possess it. Rather than a simplistic call to all humans to better exercise their divinely appointed stewardship, the

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[1103] McFague, *The Body of God : An Ecological Theology*, chapter 6.
[1104] Ibid, p. 4. Throughout the rest of the book she often fails to uphold this, however, often speaking of all humans as "we." (eg pp. 105, 108-110).
[1105] Kwok Pui-Lan also criticises McFague on this point, and McFague's claim that Jesus has little to say directly about other creatures (Kwok Pui-Lan, "Response to Sallie McFague," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000).).
[1106] McFague, *The Body of God : An Ecological Theology*, pp. 116-17.
[1107] Ibid, p. 117.
[1108] Diamond provides a very useful, short summary of the ecological collapse of human societies (Diamond, *Ecological Collapses of Pre-Industrial Societies*.) The low technology Aboriginal nations in Australia survived in some form or other for tens of thousands of years.
[1109] Ruether summarises the collapse of empires and those they conquered around the Mediterranean (Ruether, *Gaia & God : An Ecofeminist Theology of Earth Healing*, p. 173-87.). The rapid collapse of the Aboriginal nations in Australia is recent example.
[1110] This flows from the commitments of the first *Statement to the Nation* in 1977. A summary of many of the significant documents was collated by the then director of Assembly Social Responsibility and Justice, Robert Stringer, *Uniting Faith and Justice: A Bibliographic Essay* (1999 [accessed 30 November 2004]), available from http://assembly.uca.org.au/unitingjustice/resources/other/UnitingFaithandJustice21years.doc (relocated).
[1111] Sallie McFague, "An Ecological Christology: Does Christianity Have It?," in *Christianity and Ecology : Seeking the Well-Being of Earth and Humans*, ed. Dieter T. Hessel and Rosemary Radford Ruether (Cambridge, Mass: Harvard Univ Pr, 2000), p. 35. This is a claim Kwok Pui-Lan, with some justification, rejects (Pui-Lan, "Response to Sallie McFague.")

rich among us are confronted with the challenge of Christ, who placed himself in solidarity with (as opposed to patronising benevolence towards) the poor.

Life as the image of God allows us to see the basic connection between landless peasants and the animals around them, suffering at the hands of the rich and powerful humans who exploit them. The false distinction between social justice and ecological justice disappears. We see that the main ecological dynamic on Earth at the moment is that between the resource rich and poor, the latter including most humans and most other animals[1112].

A theology which seeks to enrich God's experience of life, then, is called to embrace the radical *humbling* of humanity, not its extinction. The eventual extinction of humans will not remove pain, suffering and death from the planet, any more than our appearance precipitated it. There is no pre-human Eden for the rest of life to return to after our passing. Biocentric theology hears the echo of the one who called his followers to humble themselves in order to participate in Life, who, according to the records we have, spoke more about the perils of hoarding resources than anything else.

But can it ever work? Let us suppose that despite all the unknowns about the ultimate impact of human mediated extinction, we decide, in the interests of furthering our own spiritual quest, to love God. We decide that to follow Jesus' ethic of wealth, interpreted for our day, is a good thing. Could whole societies ever actually follow the teaching of Jesus? I must confess to being sceptical that high technology societies could achieve this; based on the historical evidence of the relationship between technology and humans. Jesus' near obsession with the dangers of wealth gives Christians further cause to be sceptical. Is there, then, any context in which his ethics, or his vision *might* prevail?

10.7 Bioregional ethics- where might ethics "work"

Dutney points out that Jesus never said his ethic *would* prevail. Christians are not called to do what works, but to do what they do because of what God is like, because the reign of God has come near[1113]. Luke tells us that Jesus called us to be merciful because that is what God is like[1114], not because we will be better off if we do. The call of Jesus was not to love our neighbour, but to love our enemy. This includes those who consciously and unnecessarily seek to harm, even kill us. It surely then extends to those who consciously seek our demise out of necessity, such as the lion. And even more so those who unconsciously assault us, from annoying mosquitos to deadly parasites and microbes. What does turning the other cheek mean in this context?

Jesus' ethics may have been impractical, but Walter Wink believes he also taught a practical way of resisting being treated unethically, a way of resisting exploitation. In turning the other cheek and going the extra mile Jesus was teaching us to confront and upstage those who exploit us[1115] with a minimum of violence and danger to ourselves. This could, very playfully, condone our swatting of mosquitos, using an open hand rather than a backhanded slap.

Is there any hope that communities which act graciously towards all life, whilst resisting the ungracious actions of others, could survive? Can Christian communities really exist?

It seems reasonable to think that Jesus' ethic might be most possible for those to whom it was addressed; small communities of technology poor, relatively communal humans surviving in a

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[1112] Well treated stock, for example, are relatively resource rich, as are most species whom humans consider vermin, such as rats and cockroaches, whose population levels have exploded commensurate with human populations.
[1113] Dutney, *Love Your Enemies*.
[1114] Luke 6:36, "Be merciful, just as your Father is merciful."
[1115] Ched Myers, *Who Will Roll Away the Stone? Discipleship Questions for First World Christians* (Maryknoll, New York: Orbis, 1995).; Walter Wink, *Naming the Powers : The Language of Power in the New Testament*, ed. Walter Wink, *The Powers ; V. 1* (Philadelphia: Fortress Press, 1984). His *Powers* trilogy is slightly reworked and summarised in Walter Wink, *Jesus and Nonviolence: A Third Way*, *Facets* (Minneapolis: Fortress, 2003).

challenging environment. That environment could be an exploitative high technology society, or "wilderness." Jesus' ethic is in a sense a call to those small communities to return in some way to the practices of the pre-technological communities from which we evolved. A call to attempt to re-enact those small Pleistocene-like communities in which all shared equally in the likelihood of joy and pain, birth and death. In other words, Jesus might be calling his followers back to embrace the pattern and ethic which comes directly out of, rather than opposing, human evolution. Might this be the best, even the only, context in which his ethics "work"? They certainly seem to have had little effect in large high technology societies[1116].

This may be because it is impossible to actually *have* an ethical system where one's actions are divorced from the consequences, and this is exactly what technology achieves, at least over the time scale of human generations. The smaller and lower technology a group, the less divorced the individuals are from the consequences of their actions, both socially and ecologically. Dutney's claims that Jesus calls us to imitate God, rather than do what is practical, must be tempered by Jesus' repeated assurance that there were consequences for our actions. How hard it is for the rich to enter the kingdom of heaven! We are to renounce earthly wealth to gain heavenly wealth[1117].

The biological material through which our ethical systems emerged (primarily our brains), evolved within small groups of socially organised animals. Our ethical systems gained complexity as our brains did. Reciprocal altruism appears to be the genetic basis by which ethical and proto-ethical organisms survived. We might expect, then, that social constructions in which reciprocal altruism, consciously pursued or not, is possible, are likely to enhance the pursuit of ethics. In other words, we need small, relatively stable communities whose technology does not allow them to exploit the resources of others without having to engage socially with them. It may be possible to set up such communities within existing, high tech societies, though it would come at considerable cost. The early Christian communities discovered this[1118], as have the many Christian intentional communities which have come and gone since. It would appear, however, to be a minimal requirement for any ethic if it wants to escape the need to constantly cut across the very valuable moral mores we have evolved over the millennia. The choice appears to be between being immoral (even if only because we are caught up in an immoral system), or being poor.

So an ethic which minimises its discord with our evolutionary past requires a movement towards localised living, where cause and effect are joined, learning to live in such a way whilst knowing that most people will not. Such groups will not simply be left alone by the more technological system in which they are immersed. There will inevitably be a constant systematic tendency for the surrounding society to remove resources from the smaller group. What, then, to do?

One possibility is to accept the situation, to embrace social poverty and even biological death as the precondition for eternal life (either now or post-mortem). Such communities would, by definition, be short lived unless they could evangelise others to their cause. But evangelism requires contact with others…

[1116] I write this in the last days before the 2004 American election, where high profile Christian leaders like Jerry Falwell saying, "I'm for the president to chase [terrorists] all over the world. If it takes 10 years, blow them all away in the name of the Lord." (http://www.sojo.net)

[1117] There is an enormous literature about whether this reward was seen by Jesus to be a post-mortem reward, or participation in a present reality, renouncing a wealthy life to find real life. All we need accept is that there were consequences of the decision to imitate God or not. There is also the doctrine of grace, which contends the opposite, that God treats us not as we deserve, not as consequences would predict, but as God freely decides to. The tension between grace and justice/consequences fills Christian literature. In a biocentric theology with no hope for a post mortem life, eternal life must be something available now. Grace sounds somewhat like contingency, though the latter can have negative as well as positive surprises.

[1118] Schweitzer points out that the Jerusalem church, whose rich members apparently sold what they had to share with their poor members, soon went broke and had to beg money from the churches which Paul, with his economic pragmatism, founded (Schweitzer, *A Place for Revelation*, p. 61.)

Some therefore seek to share resources with other like minded groups, to build a power base with which to resist exploitation whilst proclaiming their message. But as such power is acquired, and the groups become resource rich, they become both more desirable targets for exploitation, and more like the societies they are trying to resist.

One could attempt to render the surrounding system's technology impotent, forcing its members to be accountable. Thus the various projects for revolution which at their best seek to impose democracy on technologically hierarchical societies. Again, such actions usually require significant technology to be effective, and thus rarely if ever achieve their ideals.

Accepting that there is little hope of prevailing in any way in direct confrontation against technological systems, others attempt to create geographic barriers that minimise the system's ability to exploit the group. Various movements in Australia have attempted this since the founding of the colonies. Increasingly, however, this is only possible for those who have profited enough from the system to be able to purchase land at its current inflated prices. Australia has a lot of very remote land, but all of it is claimed by somebody, and the inland areas only ever supported small, nomadic populations. Most eco-communities desire to be settled on arable land, which requires reasonable proximity to the coast. Sprawling suburbs eventually force up land prices and rates to the point where small communities of cash poor subsistence dwellers are forced out[1119].

Escape, defence, parasitism. Ecology has a lot to teach us about the wheres and hows of communal living, from how to grow food to where to locate ourselves when we try to do so. Is there any hope that these small ecological communities will again become typical of human existence, rather than rare exceptions? That their somewhat apocalyptic lifestyles will become mainstream? That the rich will escape or renounce the dis-ease of wealth and the technology they use to get it?

Many seem to think so. Ecotheology is replete with calls to humanity to use our technology for good, to help us walk lightly on the Earth and share, rather than hoard, resources. I must confess to being more sceptical, and I believe this to be an area where the scientific stories of life and Jesus' teaching are fully consonant. I want to emphasise that it is the *possession* of technology, not something inherent in the people who possess it, which is the problem. There are no "bad" and "good" people. Humans with technology can be thought of as being infected with some sort of virus, and those without it are largely those not yet exposed to it, while a minority are those who have successfully developed immunity.

Technology's closest biological parallel is a parasite: it needs a host to reproduce and function[1120]. It manipulates its host's behaviour to enhance it prospects of reproduction. It mutates rapidly and therefore keeps it host constantly vulnerable to new infections (witness the rapid uptake of flat screen televisions and DVDs, and the endless purchase of new mobile phones to replace perfectly adequate ones). It is partly symbiotic, in that it confers some advantages to its host: high technology humans live longer than low technology humans, and their offspring are likely to survive longer too. Yet, since its method of reproduction differs from its host, in other ways it reduces its host's reproductive potential[1121]. High income, high technology families have less children. Resources which might have been put into successful reproduction by the host are diverted into reproduction of the parasite. Dawkins also points out that the earlier the parasite enters the host, the more effectively it can manipulate its developmental behaviour[1122]. It brings to mind a past Adbusters campaign, in which we

[1119] In Australia, Grassroots magazine often contains stories of those struggling to make ends meet after moving to their "self sufficient" block of land. This problem has been long acknowledged, both in Australia (Mary Moody, *The Good Life* (Sydney: Lansdowne, 1983), pp. 12-14.) and abroad (John Seymour, *The Self-Sufficient Life and How to Live It*, 2nd ed. (New York: DK, 2003), pp. 290-93.).
[1120] There is much speculation, of course, that technology will eventually become self replicating and therefore more like a bacteria, independent of any human host.
[1121] Dawkins, *The Extended Phenotype*, p. 224.
[1122] Ibid.

gaze over the shoulder of a young child, who sits mesmerized in front of a television set. On the back of his neck we see a barcode, and beneath the photo is the by-line, "The product is you."

Bar codes were consistently linked to the number of the beast, which preoccupied those in the Pentecostal church I attended as a new convert, and the many guest speakers who came to warn us of the coming apocalypse. Instead of humans possessing technology, perhaps we should think instead of certain humans being possessed *by* technology. The rich, then, are not evil, but victims. They are possessed by the Enemy. Christian tradition has long and often spoken of Jesus as the one who came to save those who were possessed. Dare we imagine that it is the rich, not all humans, who need to be saved in the primary, or direct sense?[1123] Jesus came to set them free from their possession, a possession he successfully resisted in the wilderness. When our finitude presses in on us, technology comes as the Tempter, promising us that we will be able to provide for all our needs, that we will be capable of great feats without paying the consequences, that we can rule the world, if only we give ourselves over to it. Most if not all of us who have faced the temptation have failed.

So, Jesus comes in the first instance to liberate these captives, the possessed. Only in a secondary sense do the poor need to be saved - saved from the unnecessary harm inflicted on them by the possessed, who are able to break every chain used to bind them. Yet both rich and poor participate in their salvation. The rich must renounce their possession and fill their lives with relationships, so as to leave no room for repossession. The poor participate in their salvation through resistance. Through asserting their equality by turning the other cheek.

For technology is not immortal or unassailable. It too is subject to "natural" selection. Some hosts seem to develop a level of immunity and resist reinfection. If they group together this enhances their level of immunity. Pieces of technology also require resources for survival which their host does not: oil, silicone, plastics and metals. Like most organisms, as technologies multiply they diminish the resources on which they depend for survival, especially since their hosts practice little recycling and thus the "dead" cannot be broken down and reused. Some resources are by definition unrecyclable, like oil. It is far from clear that there is an alternative energy source sufficient to allow technology to spread over the whole globe, or even persist at current levels in existing populations. The wars amongst its hosts which are beginning to occur to secure the survival of technology (think oil rich Kuwait and Iraq, and even East Timor) may paradoxically, by greatly diminishing the number of hosts, and by engaging technology in competition with itself, significantly reduce the amount of technology in the future. Through war and the undermining of their resources, large technological societies repeatedly sow the seeds of their own destruction, creating a breathing space for those who have retained the memory needed to survive off the land in low tech ways, and managed to remain isolated from the conflict.

This is one apocalyptic vision we have often been presented with - a post World War III Earth in which small groups of humans eke out a living with a greatly diminished technological capacity. Whether the post apocalyptic generation would be any better at using technology differently is doubtful, and the whole cycle may repeat itself a few hundred or thousand years hence until Earth witnesses another externally driven extinction event, such as an asteroid strike.

Or perhaps, now that we are so populous and travel so quickly, we will encounter a microbial pathogen which causes a massive population crash because we are unable to find a cure. Unlike wars and asteroids, this would greatly reduce human numbers without the associated devastation of the ecosystems around us, and would surely be the preferred option for any other species able to reflect on it, not to mention the God who values all of these species.

[1123] Although we cannot know how ironic he was being, Jesus is often quoted as saying that his ministry had a limited scope, to the lost (Luke 19:10), and to those who are sick (Matthew 9:12; Mark 2:17; Luke 5:31-32).

One thing is certain, human population growth will not continue at the present rate for long, and it will almost certainly be curtailed spectacularly. There is little short term hope that we will avoid this fate. In the long term, of course, our passing is inevitable. Biocentric theology has no hope for humanity, and does not *need* one, at least not a hope of prevailing. Although fears of a present apocalypse obsess us at times[1124] and we fill books in the attempt to avoid it, the whole Earth will experience a final, inevitable apocalypse four billion years from now. We will not prevail.

Fortunately, Jesus does not *call* us to prevail. The motivation for forming small communities of technology resistant humans should not be to prevail. Hope of prevailing is the desire to create a system which works, which is victorious, but Jesus has called us to do what is right, not what works. He calls us to embrace death in order to enjoy life while we have it. True hope exists in the fact that our evolutionary origins bequeath us the desire for intimacy and autonomy, a quest for meaning in which we can continue to love and be loved, to apprehend God and life even as it crumbles around us. A hope that the image of God, both as likeness and as relationship, continues around us, and after us, and will be resurrected after we are gone, whether our exit is induced by rich humans or external factors. A hope that, in the meantime, our actions might preserve some of this image, both for the future and for ourselves now, and most especially for the God who called the whole glorious mess into being in the first place.

Here, then, is a brief recapitulation of a sketch of an ethic which Christian biocentric communities might use to live out their hope.

10.8 A Biocentric ethic – a brief sketch

- It would not be a conservation ethic, since we know that life is not static. What has been, and what is now, is not what should be.
- It would be an evolutionary ethic, but *not* an 'improvement' ethic. There is no anthropotelism or consciousness-telism. What will exist is not better than what has existed.
- Though consciousness is not the end point or goal of life, it is nonetheless significant. When decisions about the treatment of persons need to be made, their level of consciousness will be a factor, though not always the controlling one. Likewise for judgments about a person's moral responsibilities, which depends not on their species, but their capacity.
- Rather than seeing their ethical vision as a battle against their evolutionary past, it would look to clues from this past in understanding where, why and how their vision might be enhanced.
- It would seek to promote God's richness of experience, primarily through promoting rich relationships amongst its members and all life. The good life is the life which enriches the experience of God, both experience *through* life forms and experience *of* them and their relationships. Though no life form is sacred and irreplaceable, all are valuable.
- It would appreciate that these relationships come and go, as all of life is in a state of flux. It would need to rethink how the relationships of community members, including sexual relationships and marriages, fit into that.
- Since all of life is the image of God, and a lens through which we encounter God, then Schweitzer's reverence for life will provide a fruitful source of reflection, though his horror at the process of natural selection[1125] and death would need to be addressed.
- It would accept that the world in which it lives is neither benign nor malevolent, and that its survival relies on the exploitation of life around it, and resisting being exploited to some extent.
- It would see human "disability" as diversity of experience, making the people with disabilities at least potentially more valuable to God than the multitudes of able bodied and minded people with their relatively more homogenous experience.

[1124] Catherine Keller, *New Forward to Apocalypse Now and Then* (unpublished manuscript: 2004), p. 1. Keller's forward, partly in response to email discussion we had, makes the point that although there is an inevitable apocalypse in the very far future, most of us are concerned to address the more immediate threat of a human initiated one.
[1125] Schweitzer, *A Place for Revelation*, pp. 15-18.

10.9 Summary

My thesis is that there is no ontological discontinuity between human beings and the rest of life on Earth. Further, the goal of evolution is not the production of *Homo sapiens*, or even of conscious life. Indeed, there is no scientifically discernable goal in evolution; it is a process without meaningful trends even though, necessarily, there is an overall increase in complexity[1126].

Christian theology, then, must speculate on why God created the world in the context of this negative conclusion from science about evolution's teleology. The traditional belief, that God desired something to love, is consonant with, though not derivable from, the scientific data. Process theology says that God created the universe to have rich experiences, but this must be separated from its very consciousness-telic understanding of life. Every part of the diverse expressions of life on Earth, past present and future, add to God's richness of experience, primarily though enhancing the richness of relationships amongst organisms, and between organisms and God, since God relates directly *to* and *through* all life, and has experiences *of* all life[1127].

God's mission, then, was simply creation. It is to relate to and through creation. Biocentric theology affirms God as creator, but rejects those paradigms which claim that God somehow directed the course of biological evolution, or even the development of the universe. God wanted life, not any particular form of life. God has no particular career goals for the kids.

On Earth, the image of life cannot be limited to *Homo sapiens.* Neither can it be sorted into some kind of hierarchy, mostly because of the theological objection to the divisions this would create within *Homo sapiens*. Outright rejection of any concept of the image of God has some merit, since God has not manipulated life on Earth. Yet that would imply that life has no relationship with God. So biocentric theology affirms that life is the image of God. Life as a pulsing, flowing whole. This is consonant with the elements of the science story which point us beyond boundaries: whether of species or even individuals.

The Christian claim that God is Trinity cannot be limited to the androcentric description of God as Father, Son and Holy Spirit. Even the anthropocentric addition of Mother is insufficient. Rather, biocentric theology affirms the underlying claims which Trinitarian theology makes about God; that God is beyond us, became one with us, and remains among and within us. The God who transcends us and exists apart from us is nonetheless in relationship with us - having become one of us and remaining amongst and even within us. Surprisingly, in biocentrism God becoming one of us means God becoming *human*, though God amongst us refers to all life.

From the theological claim that all life is the image of God flows the theological expectation that all life will exercise dominion on Earth. This makes good sense of the ecological data. This dominion is expressed, so science tells us, predominantly in competition for resources, either by individuals or by temporary cooperatives. This dominion includes the evolutionary past and the ecological present, it involves creating life and taking it. Scientifically, Earth is neither benign nor malevolent, and theologically we declare it all to be good. Also theologically, we conclude that all life participates in the mission of God: the enhancement of God's richness of experience, whether consciously or not.

If life is the image of God, exercising dominion for God, and participating in the mission of God, then it makes sense to speak of all life as part of the family of God. At a minimum, following Whitehead,

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[1126] Life must necessarily have been extraordinarily simple when it began, and therefore could only get more complex. The various reasons for this increase in complexity, such as the survival advantages of multicellularity and sexual reproduction, have already been discussed.

[1127] I accept the point common to process theology and other philosophical systems which reject an ontological discontinuity between life and non-life, but have decided not to pursue this in this thesis. It is a sufficient challenge to argue that humans are in continuity with all life.

this family of persons includes all creatures with some consciousness. Given the image of God I am proposing, personhood cannot be limited to individual consciousness. A person is someone that has relationships, and all life has a relationship with God and with other life. There is no more need to rank people than there was to rank the image of God. Indeed, it would have the same theological peril.

Jesus of Nazareth comes to us through the Christian tradition as another image of God, often seen to be a unique image of God amongst humans. Or perhaps a unique image of the God-human. Paradoxically, the more ecotheologians try to affirm the rest of life on Earth by giving the incarnation in Jesus cosmic or Earthly significance, the less biocentric they become, often implying that there is something fundamentally wrong with life on Earth that needs to be redeemed or rescued.

The biocentric theology I am proposing, instead affirms death and pain and suffering as good parts of creation, not evidence of its fallenness. Jesus therefore has no direct role in life beyond humanity - there is nothing there to save[1128]. Jesus' mission was to enhance God's richness of experience of Earth. To promote life. We hear strong echoes of this in the gospels, the Christ who came that we might have life, and have it in abundance. Yet we do not hear Jesus telling us to escape death, rather he calls us to embrace it in order to live. It may be that his mission is to save those who have succumbed to an overwhelming fear of death, who through trying to save their lives are actually already dead. He especially seems to have targeted those who try to buffer themselves from finitude through their wealth, arguing that nobody can follow him unless they give away all they have. Free from wealth, from technology, they are then reengaged with life, and thus the image of God and indeed God. The biophilia hypothesis suggests that this depth of relationship and the psychological health it brings is only available to those who engage with the Wild Other. Jesus, then, came to save humans back *into* creation, not *out of* it or even *with* it. We are not called to save Earth through being good stewards, but, if anything, by returning to being plain members of the Earth community.

Having helped us embrace our biological death, has the incarnation also somehow won us a non biological life afterwards? Is there a heaven? While there is nothing in biocentric theology which definitely excludes this, I have not come across any vision of this heaven which makes sense. It is hard to see how, should we enter into a non-biological existence, we could remain in any way recognisably ourselves. Perhaps there is an afterlife where we somehow exist in the memory of God, but this is a very different image from the personal resurrection traditionally envisaged in Christianity, and especially from the bodily resurrection apparently expected in the biblical witnesses. It would also be a completely deterministic afterlife, where our every action was determined by God's imagination. Finally, it is difficult to see how we could remain ourselves divorced from the finitude which so shapes who we are and what we do.

If there was no bodily resurrection, no life after death, then what do we make of The Resurrection - that central Christian symbol? If it is not meant literally[1129], as many theologians have claimed[1130], what does it mean biocentrically? To me it carries strong parallels to the evolutionary process, if we take a God's eye perspective. Following the death of species comes the resurrection of new ones. These species are somewhat continuous with the old (for they are genetically related) but are nevertheless something altogether new. Not all evolution has this resurrection quality, but at the level of punctuations, and especially mass extinctions, we see life "dying" only to be raised again in new forms. Hope for a species, even the human species, is not for the sort of eternal life won through invincibility but through resurrection.

Here we begin to come full circle. I pointed out previously that the *Basis of Union* also talks about the Kingdom of God, the final eschatological event, as something which belongs to this world, rather than

[1128] Unless, of course, they have come to fear death to the extent that it is preventing them participating in life. But then we would expect that they would experience an incarnation of God appropriate to them, which certainly would not be Jesus.
[1129] It *could* be literal in biocentric thinking, but the challenge is to work out what it would mean if it isn't.
[1130] Reviewed, for example, in Peter Carnley, *The Structure of Resurrection Belief* (Oxford, [Oxfordshire]: Clarendon Press, 1993).

some new heavenly existence. Resurrection is mentioned only once, and that is *Jesus'* resurrection. For everything else the *Basis* anticipated consummation. How much consonance is there between the *Basis* and the biocentric theology I am proposing? Of course the *Basis* is not actually biocentric, but we notice some interesting trajectories when we re-read it through a biocentric lens. I have argued that biocentric Christianity is consonant with science without being derivable from it. Has it remained consonant with the *Basis*, without claiming to be derived from it? Is the pursuit of a biocentric faith a valid preoccupation for a minister of the Uniting Church, or are they at such cross purposes that one or the other must be abandoned?

10.10 Reading the *Basis of Union* biocentrically

In the first section, the *Basis* talks of God's desire for salvation for all people. I have argued that this salvation is primarily salvation from the chronic fear of finitude which prevents us entering into the abundant life which God desires for all people. I have speculated that this life denying fear is confined to *Homo sapiens*, and not even to all of us. This fear leads some humans to inflict harm on others, who are then saved in a secondary sense, by being relieved of this harm through the transformation of those who are overwhelmed by fear. At the end of section one the *Basis* declares that the church

> "… awaits with hope the day of the Lord Jesus Christ on which it will be clear that the kingdom of this world *has become* the kingdom of our Lord and of the Christ, who shall reign for ever and ever."

This reiterates the very this-worldly emphasis of the *Basis* which I highlighted in chapter 6.2, and of the biocentric theology I am proposing. This-worldly salvation is primarily directed at the rich, possessed by technology, and only secondarily to the poor persons who suffer as a result. It is a salvation which returns all persons to the finitude filled cycles of exploitation and domination.

In section two the Uniting Church is located within the unity of the whole Church, and it commits itself to recognising unity amidst great diversity. Hear the ecological echoes. We know ecologically that unity is not found in uniformity, but enormous diversity, connected by a common (genetic) inheritance. So, when the Uniting Church commits itself to transcending cultural, economic, national and racial boundaries, biocentric thought sees a trajectory which eventually transcends the species boundary itself, locating Uniting Church members not just within the unified diversity of the Church, but of life itself. While the *Basis* strives for union, biocentric thought acknowledges that it already exists.

In section three the *Basis* reflects on the person and work of Christ, claiming that he was given by God to take away the world's sin. Since we have rejected the traditional views of the Fall, what do we make of the "world's sin," and it being taken away? Firstly, God loving and Jesus taking away the sin of the "world" is a synonym for humanity in the relevant biblical witnesses, rather than literally meaning all creation[1131], and this is probably the sense in which the *Basis* intends it. This would reflect the reforming and evangelical traditions, which emphasise the more existential experience of sin: the sense of incompleteness, discord and broken relationships which are seen to demonstrate the separation of humans from God and thus each other.

Adding our biocentric reflections, Jesus may be thought of as coming to take away the sense of discord amongst humans, which results from being overwhelmed by the fear of finitude and death. Jesus, then, offers atonement for those humans who need it. Through the exorcism of technology/fear of death comes at-one-ment with life and the God of life. The barrier to atonement is not God's rejection of a relationship with the human because of their sinfulness, but the human's fearful rejection of God's life. This is quite different from traditional ideas of, for example, propitiatory or substitutionary atonement.

[1131] Predominantly in the gospel and epistles attributed to John.

Nevertheless, since the *Basis* deliberately withholds from speculating on the way in which atonement works[1132], this biocentric atonement is not at odds with the *Basis*.

The *Basis* goes on to say that salvation results from the trust in God as Father which comes through the work of the Spirit, given to all people. The salvation Jesus brings is, we are told, the work of God alone. How humbling. We have no role in salvation. Compared to this, the realisation that we have not been entrusted to control the ecosystems of the planet as stewards or servants is a minor disappointment.

When the *Basis* says that the Spirit was given to all people, biocentric thinking assumes that this encompasses much more than human beings. Here again we extend something hinted at in the *Basis* itself, for it goes on to call Jesus both Lord of the Church and head over *all things* - the beginning of a new creation and a new humanity. By mentioning both *separately* it displays its anthropocentric paradigm[1133], but by mentioning *both*, it nonetheless links the two.

So what is the Church? A Church, *Ecclesia* in Greek, is literally a gathering, often with a sense of being called. The *Basis* says that Church is the "[community] of the Holy Spirit." Christian tradition, even anthropocentric versions, also acknowledges that the Holy Spirit has a relationship with all creation. God is in communion with all of life, so life is the community of the Holy Spirit. The Church is the community of the Holy Spirit. Life is the community of the Holy Spirit. Life is the Church, the Earth Church, the gathering called by God to relationship with God. Within the Earth Church *Homo sapiens* makes up a recent denomination, admittedly with many sub denominations within it. Humans are the Baptists of the Earth Church[1134].

We are now well beyond the boundaries imagined by the authors of the *Basis*, but still I believe on a tangent which can legitimately be read in their text. Let us continue to read the *Basis* for a moment as members of the Earth Church.

Section three goes on to tell us of the, "…coming reconciliation and renewal which is the end in view for the whole creation." By end it means not just purpose, but end-point, since the paragraph goes on to talk about a *final consummation.* But in a world not fallen into sin or corruption, what does reconciliation mean, or renewal? It cannot mean renewal to a pre-human Eden where there is no pain or death. Here again the idea that Jesus came to save humans back *into* creation, back into their acceptance of finitude and especially death, sheds some light.

To the extent that humans accept their finitude and escape the control of fear, they are reconciled to their place in creation. We would imagine that should this occur, the short term result would be a dramatic reduction in resource consumption, land clearance and the like, which would allow for a renewal of the ecosystems around us, and the diversity of life they contain.

Thus the human Church, which is,

> "… a fellowship of reconciliation [returning humans to their proper place in life], a body within which the diverse gifts of its members are used for the building up of the whole, an instrument through which Christ may work and bear witness to himself…"

[1132] Even the chair of EMU in Victoria admits that the *Basis* does not enter into detail on this point, though he clearly wishes it did (Walter Abetz and Katherine Abetz, "Substitutionary Atonement," in *Swimming between the Flags*, ed. Walter Abetz and Katherine Abetz (Bendigo: Middle Earth Press, 2002), p. 47.)

[1133] It also reveals its ecclesiocentrism when it states that only people in the *Church* have been given the Holy Spirit.

[1134] The same connection can be made by linking the human church as the body of Christ (sections three and seven) to the Earth as the Body of God, a line pursued so influentially by Sallie McFague, though I have not emphasised it particularly in this thesis. A hint of this is found in the Commission on Faith and Order, which in 1985 described the church as, "… an opening into the vast 'living body' of God's creation as a whole, altogether destined for liberation and rebirth." (cited in Dutney, "Creation and the Church," p. 54.)

is but a component of the Earth Church, which was created,

> "To be a community[1135] of reconciliation [open ecological relationships], a body within which the diverse [evolved] characteristics of its members result in the building up of the whole [pulse of life] which bears witness as the image of God."

The description of the human Church as a community comprised of diverse members in relationship with each other is thoroughly ecological[1136]. This ecological metaphor is echoed in the description of the relationships between diverse gifts and ministries in section thirteen.

This ecological model is followed by a decided evolutionary one when the *Basis* calls the Church a *pilgrim people*, always on the way [evolving] toward a promised goal. There is no suggestion in the *Basis* that the human church of 1977 is any better than that of 1000, or even 30. There is no suggestion of the liberal doctrine of gradual improvement; so we can imagine an echo of the evolution of life, which has no teleology but to exist in relationship to God and enrich God's experience as it does so. When Christians claim to be on a pilgrimage, then, this does not alienate us from the rest of life, or relegate it to a backdrop on which our adventure occurs. Rather, it reminds us how much we are a part of life on Earth, as we saw suggested earlier in World Environment Day 2001[1137]

The second allusion to pilgrimage, which comes at the end of the Basis, sounds similarly evolutionary. It is the practical application of section 11, which acknowledged the need for theology to be free to mutate into fresh confessions of the Lord in response to new environments. Section seventeen therefore commits to mutating its laws in response to new environments, and section eighteen accepts the need for constant correction (evolution) as it continues toward the promised end. What is this end? We could consider it to be the time at which humans are reconciled to their finitude filled place in the world. Yet this is not guaranteed. Even if it did happen, life and evolution would not then stand still. Since the *Basis* believes that the end is *promised*, we might equate it with the end promised by the sciences, the consummation of life in the final, total death of the planet in approximately four billion years time.

The *Basis* reminds us of the serious duty of reading the scriptures, with the help of scholarly interpretation as outlined in section eleven. In this context, biocentric theology recognises not only the androcentrism and classism which scholars have identified in the biblical witnesses and their interpreters, but also anthropocentrism. Like feminism, it finds it possible to retrieve minority voices which critique the dominant ideology. It also accepts the need to add theological construction to this retrieval. The minority voices do not say all that needs to be said. The same approach must be taken to the creeds, which will need, as the *Basis* itself admits, to be reinterpreted in this new biocentric age. Likewise the Reformation Witnesses, who will need to be understood to have been addressing only the humans, with our need to be again and again reminded of grace, the centrality of Christ, and the need for constant appeal to the scriptures.

Finally, the sacraments. Baptism, which initiates us into the Christian pilgrimage, and the eucharist, which sustains us on the journey. As discussed in chapter 6.2.5, *Healing the Earth* proposed some novel ways of imagining the eucharistic nature of Earth, which would have far reaching implications for our theology and worship life if adopted. *Healing* claims that the elements of the eucharist are actually gifts of God for *all creation*, not just humans and far less the Christians gathered to drink and eat them. This has considerable consonance with the idea that humans are not the only persons. Biocentric theology, however, initially reverses the direction of gift giving in the eucharist. If all Earth

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[1135] "Community" has a less blokey feel than "fellowship."

[1136] Dutney recognised the appropriateness of the ecological metaphor for the church in the mid eighties (Dutney, *Manifesto for Renewal*, p. 140- footnote 7.) A decade later Granberg-Michaelson used ecology as a paradigm for ecumenical theology (Granberg-Michaelson, "Creation in Ecumenical Theology," p. 104.)

[1137] Chapter 6.2.12.

is eucharist, then the eucharist is first a gift *to Christ*. Without Earth there would be no Jesus of Nazareth. The Earth eucharist enabled Jesus to come and share his eucharist with all people.

Since life is the Church, then we might see the human Church, when it celebrates the eucharist, as remembering the Great Eucharist in which it is constantly called to participate. The good gift - the death that brings life. We might see the broken body and poured out blood not only as reminding us of the death of Christ, but the life giving death which surrounds us every day, all the broken and bleeding bodies which make up our world, and which we will become[1138].

Healing was correct in identifying the eucharist as a gift to all creation, or all persons, but this was bound up in the assumption that all creation is fallen. Yet salvation is pictured not as an afterlife for all beings, but the reconciliation of humans and "nature." It is open to the interpretation that the eucharist is primarily a gift for those humans who need to be reminded that only by engaging in finitude, in brokenness, can they engage in life, in wholeness. Those already so engaged receive ongoing encouragement, and secondarily a greater chance to participate in the fullness of life, now that those saved from fear have made more room for them. So the eucharist is both a converting ordinance for those too afraid of finitude to enter life, and a sustaining ordinance for those people already on the journey. This implies, of course, that the restriction of the eucharist to humans is an artificial discrimination.

Death brings to mind funerals, which would become part of our eucharistic celebrations as we celebrate the end of a life to make way for new life.

New life. Baptism. The *Basis* talks specifically about baptism into *Christ's body*. This is a specifically human baptism, since Christ came primarily for humans (or some of us). It is the means by which fearful humans accept the call to participate in "Christ's life and mission in the world." The result is that they will be, "… united in one community of love, service, suffering and joy, in one family of the [God] of all in heaven and earth, and in the power of the one Spirit."

So baptism is for humans, but it is baptism into the *one family* of God, the Earth Church. The baptised are those who have, through being saved from the fear of death, returned to the Earth Church from which they became estranged. In what can be read biocentrically as a rejection of consciousness-telism, baptism is made available not only to those able to actively confess their faith, but even to infants who have no idea what is happening. Nurtured in the finitude affirming community around them, the church prays that they may grow up without experiencing the estrangement from which some adult converts are drawn to repent[1139].

Baptism into Christ's body, then, initiates people into the human Church, but this is not an end in itself. It is for their salvation, to save them from the fear of death and awaken them to their place in the finitude filled pulse of life, so that they might have this life abundantly. So that they might delight in, and contribute to the image of God in which they are immersed.

[1138] Many of us, of course, already have broken bodies in various ways. Here I am thinking of the *really* broken, i.e. decomposing.
[1139] I mean repent literally, as in the decision to turn around, rather than speculating on the morality of the convert.

11 Appendices

11.1 Appendix 1, Basis of Union, 1992

HEADINGS have been added to each section of this printing of the Basis of Union for ease of reference but do not form part of the Basis of Union approved by the Churches.

1. THE WAY INTO UNION

The Congregational Union of Australia, the Methodist Church of Australasia and the Presbyterian Church of Australia, in fellowship with the whole Church Catholic, and seeking to bear witness to that unity which is both Christ's gift and will for the Church, hereby enter into union under the name of the Uniting Church in Australia. They pray that this act may be to the glory of God the Father, the Son and the Holy Spirit. They give praise for God's gifts of grace to each of them in years past; they acknowledge that none of them has responded to God's love with a full obedience; they look for a continuing renewal in which God will use their common worship, witness and service to set forth the word of salvation for all people. To this end they declare their readiness to go forward together in sole loyalty to Christ the living Head of the Church; they remain open to constant reform under his Word; and they seek a wider unity in the power of the Holy Spirit. In this union these Churches commit their members to acknowledge one another in love and joy as believers in our Lord Jesus Christ, to hear anew the commission of the Risen Lord to make disciples of all nations, and daily to seek to obey his will. In entering into this union the Churches concerned are mindful that the Church of God is committed to serve the world for which Christ died, and that it awaits with hope the day of the Lord Jesus Christ on which it will be clear that the kingdom of this world has become the kingdom of our Lord and of the Christ, who shall reign for ever and ever.

2. OF THE WHOLE CHURCH

The Uniting Church in Australia lives and works within the faith and unity of the One Holy Catholic and Apostolic Church. The Uniting Church recognises that it is related to other Churches in ways which give expression, however partially, to that unity in faith and mission. Recalling the Ecumenical Councils of the early centuries, the Uniting Church looks forward to a time when the faith will be further elucidated, and the Church's unity expressed, in similar Councils. It thankfully acknowledges that the uniting Churches were members of the World Council of Churches and other ecumenical bodies, and will seek to maintain such membership. It remembers the special relationship which obtained between the several uniting Churches and other Churches of similar traditions, and will continue to learn from their witness and be strengthened by their fellowship. It is encouraged by the existence of United Churches in which these and other traditions have been incorporated, and wishes to learn from their experience. It believes that Christians in Australia are called to bear witness to a unity of faith and life in Christ which transcends cultural and economic, national and racial boundaries, and to this end the Uniting Church commits itself to seek special relationships with Churches in Asia and the Pacific. The Uniting Church declares its desire to enter more deeply into the faith and mission of the Church in Australia, by working together and seeking union with other Churches.

3. BUILT UPON THE ONE LORD JESUS CHRIST

The Uniting Church acknowledges that the faith and unity of the Holy Catholic and Apostolic Church are built upon the one Lord Jesus Christ. The Church preaches Christ the risen crucified One and confesses him as Lord to the glory of God the Father. In Jesus Christ "God was reconciling the world to himself" (2 Corinthians 5:19 RSV). In love for the world, God gave the Son to take away the world's sin.

Jesus of Nazareth announced the sovereign grace of God whereby the poor in spirit could receive God's love. Jesus himself, in his life and death, made the response of humility, obedience and trust which God had long sought in vain. In raising him to live and reign, God confirmed and completed the witness which Jesus bore to God on earth, reasserted claim over the whole of creation, pardoned sinners, and made in Jesus a representative beginning of a new order of righteousness and love. To God in Christ all people are called to respond in faith. To this end God has

sent forth the Spirit that people may trust God as their Father, and acknowledge Jesus as Lord. The whole work of salvation is effected by the sovereign grace of God alone.

The Church as the fellowship of the Holy Spirit confesses Jesus as Lord over its own life; it also confesses that Jesus is Head over all things, the beginning of a new creation, of a new humanity. God in Christ has given to all people in the Church the Holy Spirit as a pledge and foretaste of that coming reconciliation and renewal which is the end in view for the whole creation. The Church's call is to serve that end: to be a fellowship of reconciliation, a body within which the diverse gifts of its members are used for the building up of the whole, an instrument through which Christ may work and bear witness to himself. The Church lives between the time of Christ's death and resurrection and the final consummation of all things which Christ will bring; the Church is a pilgrim people, always on the way towards a promised goal; here the Church does not have a continuing city but seeks one to come. On the way Christ feeds the Church with Word and Sacraments, and it has the gift of the Spirit in order that it may not lose the way.

4. CHRIST RULES AND RENEWS THE CHURCH

The Uniting Church acknowledges that the Church is able to live and endure through the changes of history only because its Lord comes, addresses, and deals with people in and through the news of his completed work. Christ who is present when he is preached among people is the Word of God who acquits the guilty, who gives life to the dead and who brings into being what otherwise could not exist. Through human witness in word and action, and in the power of the Holy Spirit, Christ reaches out to command attention and awaken faith; he calls people into the fellowship of his sufferings, to be the disciples of a crucified Lord; in his own strange way Christ constitutes, rules and renews them as his Church.

5. THE BIBLICAL WITNESSES

The Uniting Church acknowledges that the Church has received the books of the Old and New Testaments as unique prophetic and apostolic testimony, in which it hears the Word of God and by which its faith and obedience are nourished and regulated. When the Church preaches Jesus Christ, its message is controlled by the Biblical witnesses. The Word of God on whom salvation depends is to be heard and known from Scripture appropriated in the worshipping and witnessing life of the Church. The Uniting Church lays upon its members the serious duty of reading the Scriptures, commits its ministers to preach from these and to administer the sacraments of Baptism and the Lord's Supper as effective signs of the Gospel set forth in the Scriptures.

6. SACRAMENTS

The Uniting Church acknowledges that Christ has commanded his Church to proclaim the Gospel both in words and in the two visible acts of Baptism and the Lord's Supper. Christ himself acts in and through everything that the Church does in obedience to his commandment: it is Christ who by the gift of the Spirit confers the forgiveness, the fellowship, the new life and the freedom which the proclamation and actions promise; and it is Christ who awakens, purifies and advances in people the faith and hope in which alone such benefits can be accepted.

7. BAPTISM

The Uniting Church acknowledges that Christ incorporates people into his body by Baptism. In this way Christ enables them to participate in his own baptism, which was accomplished once on behalf of all in his death and burial, and which was made available to all when, risen and ascended, he poured out the Holy Spirit at Pentecost. Baptism into Christ's body initiates people into Christ's life and mission in the world, so that they are united in one fellowship of love, service, suffering and joy, in one family of the Father of all in heaven and earth, and in the power of the one Spirit. The Uniting Church will baptise those who confess the Christian faith, and children who are presented for baptism and for whose instruction and nourishment in the faith the Church takes responsibility.

8. HOLY COMMUNION

The Uniting Church acknowledges that the continuing presence of Christ with his people is signified and sealed by Christ in the Lord's Supper or the Holy Communion, constantly repeated in the life of the Church. In this sacrament of his broken

body and outpoured blood the risen Lord feeds his baptised people on their way to the final inheritance of the Kingdom. Thus the people of God, through faith and the gift and power of the Holy Spirit, have communion with their Saviour, make their sacrifice of praise and thanksgiving, proclaim the Lord's death, grow together into Christ, are strengthened for their participation in the mission of Christ in the world, and rejoice in the foretaste of the Kingdom which Christ will bring to consummation.

9. CREEDS

The Uniting Church enters into unity with the Church throughout the ages by its use of the confessions known as the Apostles' Creed and the Nicene Creed. The Uniting Church receives these as authoritative statements of the Catholic Faith, framed in the language of their day and used by Christians in many days, to declare and to guard the right understanding of that faith. The Uniting Church commits its ministers and instructors to careful study of these creeds and to the discipline of interpreting their teaching in a later age. It commends to ministers and congregations their use for instruction in the faith, and their use in worship as acts of allegiance to the Holy Trinity.

10. REFORMATION WITNESSES

The Uniting Church continues to learn of the teaching of the Holy Scriptures in the obedience and freedom of faith, and in the power of the promised gift of the Holy Spirit, from the witness of the Reformers as expressed in various ways in the Scots Confession of Faith (1560), the Heidelberg Catechism (1563), the Westminster Confession of Faith (1647), and the Savoy Declaration (1658). In like manner the Uniting Church will listen to the preaching of John Wesley in his Forty-Four Sermons (1793). It will commit its ministers and instructors to study these statements, so that the congregation of Christ's people may again and again be reminded of the grace which justifies them through faith, of the centrality of the person and work of Christ the justifier, and of the need for a constant appeal to Holy Scripture.

11. SCHOLARLY INTERPRETERS

The Uniting Church acknowledges that God has never left the Church without faithful and scholarly interpreters of Scripture, or without those who have reflected deeply upon, and acted trustingly in obedience to, God's living Word. In particular the Uniting Church enters into the inheritance of literary, historical and scientific enquiry which has characterised recent centuries, and gives thanks for the knowledge of God's ways with humanity which are open to an informed faith. The Uniting Church lives within a world-wide fellowship of Churches in which it will learn to sharpen its understanding of the will and purpose of God by contact with contemporary thought. Within that fellowship the Uniting Church also stands in relation to contemporary societies in ways which will help it to understand its own nature and mission. The Uniting Church thanks God for the continuing witness and service of evangelist, of scholar, of prophet and of martyr. It prays that it may be ready when occasion demands to confess the Lord in fresh words and deeds.

12. MEMBERS

The Uniting Church recognises and accepts as members all who are recognised as members of the uniting Churches at the time of union. Thereafter membership is open to all who are baptised into the Holy Catholic Church in the name of the Father and of the Son and of the Holy Spirit. The Uniting Church will seek ways in which the baptised may have confirmed to them the promises of God, and be led to deeper commitment to the faith and service into which they have been baptised. To this end the Uniting Church commits itself to undertake, with other Christians, to explore and develop the relation of baptism to confirmation and to participation in the Holy Communion.

13. GIFTS AND MINISTRIES

The Uniting Church affirms that every member of the Church is engaged to confess the faith of Christ crucified and to be his faithful servant. It acknowledges with thanksgiving that the one Spirit has endowed the members of Christ's Church with a diversity of gifts, and that there is no gift without its corresponding service: all ministries have a part in the ministry of Christ. The Uniting Church, at the time of union, will recognise and accept the ministries of those who have been called to any task or responsibility in the uniting Churches. The Uniting Church will thereafter provide for the

exercise by men and women of the gifts God bestows upon them, and will order its life in response to God's call to enter more fully into mission.

14. MINISTERS, ELDERS, DEACONESSES AND LAY PREACHERS

The Uniting Church, from inception, will seek the guidance of the Holy Spirit to recognise among its members women and men called of God to preach the Gospel, to lead the people in worship, to care for the flock, to share in government and to serve those in need in the world.

To this end:

(a) The Uniting Church recognises and accepts as ministers of the Word all who have held such office in any of the uniting Churches, and who, being in good standing in one of those Churches at the time of union, adhere to the Basis of Union. This adherence and acceptance may take place at the time of union or at a later date. Since the Church lives by the power of the Word, it is assured that God, who has never failed to provide witness to that Word, will, through Christ and in the power of the Holy Spirit, call and set apart members of the Church to be ministers of the Word. These will preach the Gospel, administer the sacraments and exercise pastoral care so that all may be equipped for their particular ministries, thus maintaining the apostolic witness to Christ in the Church. Such members will be called Ministers and their setting apart will be known as Ordination.

The Presbytery will ordain by prayer and the laying on of hands in the presence of a worshipping congregation. In this act of ordination the Church praises the ascended Christ for conferring gifts upon men and women. It recognises Christ's call of the individual to be his minister; it prays for the enabling power of the Holy Spirit to equip the minister for that service. By the participation in the act of ordination of those already ordained, the Church bears witness to God's faithfulness and declares the hope by which it lives. In company with other Christians the Uniting Church will seek for a renewed understanding of the way in which the congregation participates in ordination and of the significance of ordination in the life of the Church.

(b) The Uniting Church recognises and accepts as elders or leaders those who at the time of union hold the office of elder, deacon or leader appointed to exercise spiritual oversight, and who, being in good standing in any of the uniting Churches at the time of union, adhere to the Basis of Union. It will seek to recognise in the congregation those endowed by the Spirit with gifts fitting them for rule and oversight. Such members will be called Elders or Leaders.

(c) The Uniting Church recognises and accepts as deaconesses those who at the time of union are deaconesses in good standing in any of the uniting Churches and who adhere to the Basis of Union. It believes that the Holy Spirit will continue to call women to share in this way in the varied services and witness of the Church, and it will make provision for this. Such members will be called Deaconesses.

The Uniting Church recognises that at the time of union many seek a renewal of the diaconate in which women and men offer their time and talents, representatively and on behalf of God's people, in the service of humanity in the face of changing needs. The Uniting Church will so order its life that it remains open to the possibility that God may call men and women into such a renewed diaconate: in these circumstances it may decide to call them Deacons and Deaconesses, whether the service is within or beyond the life of the congregation.

(d) The Uniting Church recognises and accepts as lay preachers those who at the time of union are accredited lay preachers (local preachers) in any of the uniting Churches and who adhere to the Basis of Union. It will seek to recognise those endowed with the gift of the Spirit for this task, will provide for their training, and 'will gladly wait upon that fuller understanding of the obedience of Christians which should flow from their ministry. Such members will be called Lay Preachers.

In the above sub-paragraphs the phrase "adhere to the Basis of Union" is understood as willingness to live and work within the faith and unity of the One Holy Catholic and Apostolic Church as that way is described in this Basis. Such adherence allows for difference of opinion in matters which do not enter into the substance of the faith.

The Uniting Church recognises that the type and duration of ministries to which women and men are

called vary from time to time and place to place, and that in particular it comes into being in a period of reconsideration of traditional forms of the ministry, and of renewed participation of all the people of God in the preaching of the Word, the administration of the sacraments, the building up of the fellowship in mutual love, in commitment to Christ's mission, and in service of the world for which he died.

15. GOVERNMENT IN THE CHURCH

The Uniting Church recognises that responsibility for government in the Church belongs to the people of God by virtue of the gifts and tasks which God has laid upon them. The Uniting Church therefore so organises its life that locally, regionally and nationally government will be entrusted to representatives, men and women, bearing the gifts and graces with which God has endowed them for the building up of the Church. The Uniting Church is governed by a series of inter-related councils, each of which has its tasks and responsibilities in relation both to the Church and the world.

The Uniting Church acknowledges that Christ alone is supreme in his Church, and that he may speak to it through any of its councils. It is the task of every council to wait upon God's Word, and to obey God's will in the matters allocated to its oversight. Each council will recognise the limits of its own authority and give heed to other councils of the Church, so that the whole body of believers may be united by mutual submission in the service of the Gospel.

To this end the Uniting Church makes provision in its constitution for the following:

(a) The Congregation is the embodiment in one place of the One Holy Catholic and Apostolic Church, worshipping, witnessing and serving as a fellowship of the Spirit in Christ. Its members meet regularly to hear God's Word, to celebrate the sacraments, to build one another up in love, to share in the wider responsibilities of the Church, and to serve the world. The congregation will recognise the need for a diversity of agencies for the better ordering of its life in such matters as education, administration and finance.

(b) The Elders' or Leaders' Meeting (the council within a congregation or group of congregations) consists of the minister and those who are called to share with the minister in oversight. It is responsible for building up the congregation in faith and love, sustaining its members in hope, and leading them into a fuller participation in Christ's mission in the world.

(c) The Presbytery (the district council) consists of such ministers, elders/leaders and other Church members as are appointed thereto, the majority of elders/leaders and Church members being appointed by Elders'/Leaders' Meetings and/or congregations, on a basis determined by the Synod. Its function is to perform all the acts of oversight necessary to the life and mission of the Church in the area for which it is responsible, except for those agencies which are directly responsible to the Synod or Assembly. It will in particular exercise oversight over the congregations within its bounds, encouraging them to strengthen one another's faith, to bear one another's burdens, and exhorting them to fulfil their high calling in Christ Jesus. It will promote those wider aspects of the work of the Church committed to it by the Synod or Assembly.

(d) The Synod (the regional council) consists of such ministers, elders/leaders and other Church members as are appointed thereto, the majority being appointed by Presbyteries, Elders'/Leaders' Meetings or congregations, on a basis determined by the Assembly. It has responsibility for the general oversight, direction and administration of the Church's worship, witness and service in the region allotted to it, with such powers and authorities as may from time to time be determined by the Assembly.

(e) The Assembly (the national council) consists of such ministers, elders/leaders and other Church members as are appointed thereto, the majority being appointed by the Presbyteries and Synods. It has determining responsibility for matters of doctrine, worship, government and discipline, including the promotion of the Church's mission, the establishment of standards of theological training and reception of ministers from other communions, and the taking of further measures towards the wider union of the Church. It makes the guiding decisions on the tasks and authority to be exercised by other councils. It is obligatory for it to seek the concurrence of the councils, and on occasion of the congregations of the Church, on matters of vital importance to the life of the Church.

The first Assembly, however, will consist of members of the uniting Churches, appointed in equal numbers by them in such manner as they may determine, and is vested with such powers as may be necessary to establish the Uniting Church according to the provisions of the Basis of Union.

Until such time as councils other than the Assembly can be established, the Uniting Church recognises and accepts the various agencies for the discharge of responsibility which are in existence in the uniting Churches. It invites any such continuing bodies immediately to enter a period of self-examination in which members are asked to consider afresh their common commitment to the Church's mission and their demonstration of its unity. The Uniting Church prays that God will enable them to order their lives for these purposes.

16. PARTICULAR FUNCTIONS

The Uniting Church recognises the responsibility and freedom which belong to councils to acknowledge gifts among members for the fulfilment of particular functions. The Uniting Church sees in pastoral care exercised personally on behalf of the Church an expression of the fact that God always deals personally with people, would have God's loving care known among people, and would have individual members take upon themselves the form of a servant.

17. LAW IN THE CHURCH

The Uniting Church acknowledges that the demand of the Gospel, the response of the Church to the Gospel, and the discipline which it requires are partly expressed in the formulation by the Church of its law. The aim of such law is to confess God's will for the life of the Church; but since law is received by human beings and framed by them, it is always subject to revision in order that it may better serve the Gospel. The Uniting Church will keep its law under constant review so that its life may increasingly be directed to the service of God and humanity, and its worship to a true and faithful setting forth of, and response to, the Gospel of Christ. The law of the Church will speak of the free obedience of the children of God, and will look to the final reconciliation of humanity under God's sovereign grace.

18. THE PEOPLE OF GOD ON THE WAY

The Uniting Church affirms that it belongs to the people of God on the way to the promised end. The Uniting Church prays that, through the gift of the Spirit, God will constantly correct that which is erroneous in its life, will bring it into deeper unity with other Churches, and will use its worship, witness and service to God's eternal glory through Jesus Christ the Lord. Amen.

11.2 Appendix 2, *Statement to the Nation*, inaugural Assembly, June, 1977

People of the Congregational, Methodist and Presbyterian Churches have united. A new church has been born.

We, who are members of the first Assembly of the Uniting Church in Australia address the people of Australia in this historic moment. The path to unity has been long and at times difficult, but we believe this unity is a sign of the reconciliation we seek for the whole human race.

We acknowledge with gratitude that the churches from which we have come have contributed in various ways to the life and development of this nation. A Christian responsibility to society has always been regarded as fundamental to the mission of the Church. In the Uniting Church our response to the Christian gospel will continue to involve us in social and national affairs.

We are conscious of our responsibilities within and beyond this country. We particularly acknowledge our responsibilities as one branch of the Christian church within the region of South-East Asia and the Pacific. In these contexts we make certain affirmations at the time of our inauguration.

We affirm our eagerness to uphold basic Christian values and principles, such as the importance of every human being, the need for integrity in public life, the proclamation of truth and justice, the rights for each citizen to participate in decision-making in the community, religious liberty and personal dignity, and a concern for the welfare of the whole human race.

We pledge ourselves to seek the correction of injustices wherever they occur. We will work for the eradication of poverty and racism within our society and beyond. We affirm the rights of all people to equal educational opportunities, adequate health care, freedom of speech, employment or dignity in unemployment if work is not available. We will oppose all forms of discrimination which infringe basic rights and freedoms.

We will challenge values which emphasise acquisitiveness and greed in disregard of the needs of others and which encourage a higher standard of living for the privileged in the face of the daily widening gap between the rich and poor.

We are concerned with the basic human rights of future generations and will urge the wise use of energy, the protection of the environment and the replenishment of the earth's resources for their use and enjoyment.

Finally we affirm that the first allegiance of Christians is God, under whose judgment the policies and actions of all nations must pass. We realise that sometimes this allegiance may bring us into conflict with the rulers of our day. But our Uniting Church, as an institution within the nation, must constantly stress the universal values which must find expression in national policies if humanity is to survive.

We pledge ourselves to hope and work for a nation whose goals are not guided by self-interest alone, but by concern for the welfare of all persons everywhere — the family of the One God — the God made known in Jesus of Nazareth the One who gave His life for others.

In the spirit of His self-giving love we seek to go forward.

11.3 Appendix 3, *Statement to the Nation*, Australian Bicentennial Year, 1988

In this country which has been inhabited for 40,000 years, the Australian nation is celebrating the Bicentennial of the first European settlement. The Uniting Church, now in its second decade, greets our fellow Australian citizens on this occasion.

We give thanks for those times when the Australian society has established justice, equality, and mutual respect among people; has placed care for the people who have least above sectional interests; has welcomed new migrants and refugees; has exercised solidarity and friendship in times of crisis in Australia across divisions of race and culture; and has engaged constructively with the peoples of Asia, the Pacific and the rest of the world as peacemaker.

In the last two centuries the movements of history have brought together here in one nation, people of diverse cultures. As a church which is itself composed of people of many cultures and races, both Aboriginal and migrant, we rejoice in the vision of a multicultural society where these peoples may live together in unity and diversity, maintaining different cultural traditions, yet forging a common destiny based on commitment to the ideals of equality of opportunity, tolerance, justice and compassion.

At the same time, those of us who have migrated to Australia in the last two centuries or are the descendants of migrants, confess that all of us are beneficiaries of the injustices that have been inflicted on those of us who were Aboriginal people. In varying degrees, we all contribute to, and perpetuate those injustices. We recognise the violence which has been done to the Aboriginal people in the colonisation of this continent and the injustice by which Aborigines have been deprived of the land. We recognise the continuing Aboriginal experience of violence and injustice.

The integrity of our nation requires truth; the history of Australia, as it is taught in educational institutions or popularised in the media, must cease to conceal the reality and nature of Aboriginal society before invasion, what was done to them in colonisation, and what has been the fate and status of Aborigines within the Australian nation.

The integrity of our nation will be measured by action; by legislative action which honours the Aboriginal plea for justice, and by popular action by which the Australian people express their willingness to support Aboriginal Australians in the quest for justice and their struggle to reconstruct their society.

As for the Uniting Church in Australia, in obedience to God, in concern for the integrity of our nation, and in co-operation with all citizens of goodwill, we Aboriginal and newer Australians have determined to stand together.

In co-operation with all fellow Australians of goodwill, we are committed to work for justice and peace, calling for honesty and integrity, encouraging tolerance and compassion, challenging acquisitiveness and greed, opposing discrimination and prejudice, condemning violence and oppression and creating a loving and caring community.

We are conscious of conflicts and tensions within the nation and the world. We deplore the divisions of humanity along racial, cultural, political, economic, sexual and religious lines. In obedience to God, we struggle against all systems and attitudes which set person against person, group against group, or nation against nation.

We recognise a widening gap between the rich and the poor, not only within Australia, but within the whole human community. We will strive to uphold the rightful claims of the poor on the resources of this nation and the world. We will seek to identify and challenge all social and political structures and all human attitudes which perpetuate and compound poverty.

We affirm our belief that the natural world is God's creation; good in God's eyes, good in itself, and good in sustaining human life. Recognising the vulnerability of the life and resources of creation, we will work to promote the responsible management, use and occupation of the earth by human societies. We will seek to identify and challenge all structures and attitudes which perpetuate and compound the destruction of creation.

As a Christian church, born out of the struggles of Australian Christians to live in obedience to God in Australia, we find hope in Jesus Christ. We recognise that we Australian people are of diverse

faiths and cultures and our desire is that we live together here in one community in justice, peace and mutual respect.

May the peace of God be with us all.

Sir Ronald Wilson, President
Rev. David Gill, General Secretary

11.4 Appendix 4, Assembly resolutions on the Rights of Future Generations and Rights of Nature, 1991

91.14.18 The Assembly resolved to adopt the resolution on the rights of nature and the rights of future generations:

We believe that God, the Creator, upholds human dignity. God has created the human in the divine image. No human authority can take away or contest the dignity thus bestowed upon the human.

We believe that God has blessed humanity and that God's faithfulness endures from generation to generation.

We believe that God loves the divine creation and wills the development of its life. No creature is indifferent in the eyes of God. Each has its dignity and thereby also its right to existence.

The Holy Scriptures attest to God's covenant with the creation. "Behold, I establish my covenant with you and your descendants after you and with every living creature" (Genesis 9:9-10).

In view of the fact that this promise is today being undermined by human lack of moderation,

- we affirm the inalienable dignity of all humans and call for the recognition and guarantee of human rights throughout the world,
- we express the conviction that those who live today share responsibility for the ability of future generations to live in dignity,
- we support the attribution of rights not only to humans but also to nature, God's creation, and
- we reject the view that animate and inanimate nature are mere objects which stand at the arbitrary disposal of the human.

We call upon the churches to make room for God's covenant with creation within the realm of law by committing themselves at all levels to recognition of the following "Rights of Future Generations" and "Rights of Nature".

11.4.1 A. Rights of Future Generations

Future generations have a right to life.

Future generations have a right to an unmanipulated human genetic inheritance, that is, a genetic inheritance not artificially altered by humans.

Future generations have a right to a rich plant and animal world, and thereby a right to a life within an abundant nature and to the preservation of multifarious genetic resources.

Future generations have a right to healthy air, to an intact ozone layer, and to the sufficient thermal exchange between the earth and space.

Future generations have a right to clean and sufficient waters, and, in particular, healthy and sufficient drinking water.

Future generations have a right to healthy and fertile soil and to healthy woodland.

Future generations have right to substantial reserves of non-(or only very slowly) renewable raw materials and energy sources.

Future generations have the right not to be confronted with products and wastes of earlier generations that threaten their health or require excessive expense for protection and control.

Future generations have a right to "cultural inheritance", that is, to an encounter with the culture created by earlier generations.

Future generations have in general a right to physical living conditions that allow them a humanly dignified existence. In particular, they have a right not to be forced to accept physical alterations deliberately produced by their predecessors that inordinately restrict their individual and collective self- determination in cultural, economic, political, or social respects.

11.4.2 B. Rights of Nature

Nature — animate or inanimate — has a right to existence, that is, to preservation and development.

Nature has a right to the protection of its eco-systems, species, and populations in their inter-connectedness.

Animate nature has a right to the preservation and development of its genetic inheritance.

Organisms have a right to a life fit for their species, including procreation within their appropriate ecosystems.

Disturbances of nature require a justification. They are only permissible

- when the presuppositions of the disturbance are determined in a democratically legitimate process and with respect of the rights of nature,
- when the interests of the disturbance outweigh the interests of a complete protection of the rights of nature, and
- when the disturbance is not inordinate. Damaged nature is to be restored whenever and wherever possible.

Rare ecosystems, and above all those with an abundance of species, are to be placed under absolute protection. The driving of species to extinction is forbidden.

We appeal to the United Nations to develop a new Declaration which explicitly protects the rights mentioned above. Simultaneously, we appeal to the individual nations to incorporate these rights into their constitutions and legislation

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