Proposition 17G
Use of nuclear power in place of burning fossil fuels would not reduce the heat added to the biosphere

As well as the budget-neutral and budget-negative activities, there are some which are budget-positive, in that they tie up heat energy in some solid form, usually chemically. This is the case, of course, with plant photosynthesis, which ties up solar energy as plant carbohydrates. In this respect, nuclear power is *worse* than fossil fuel burning, because the latter at least releases carbon dioxide which will aid the budget-positive process of photosynthesis.

Having kicked this matter of heating around a bit, we are now in a position to ask whether any of it really matters at all. To answer this, we once again need to put some figures on the situation.

The Big Heat Budget

What are the relative sizes of these heat inputs and outputs? In looking at very large quantities of heat, it is common to measure heat in Q-units (1*Q* is equal to 10^{18} BTUs, or about 10^{21} joules).

Differing estimates of the Earth's total stocks of fossil fuels range between about 40 and 200*Q*. We have been using these for well over a century, and although current rates are higher than ever, we are probably still not injecting more than 2-3*Q* of heat into the biosphere each year. The potential reserves of fissionable nuclear fuels are much higher than for fossil fuels, but even so we are not actually using as much each year. A figure of 5*Q/yr* for Man's budget-negative injection of heat into the biosphere is probably well on the high side.

Such a figure pales into complete insignificance when placed against the heat the Earth receives from the Sun, which is about 5000*Q/yr*. Hold up one square metre of surface at right angles to the Sun, out in Earth orbit, and it receives the equivalent of 1.8 horsepower or 1.3*kW* of radiant energy — enough to drive an average air-conditioner.

Not all the energy sent by the Sun is absorbed by the Earth, about 30% is reflected back into space. This isolates one of the crucial factors. If the amount of heat reflected increased by only 1% (say with the average reflectance rising from 30.3 to 30.6%), this would slough off another 50*Q/yr*, some ten times the most Man is adding. Our fuel-use activities are irrelevant in the face of this factor.

Proposition 17H
Man's influence on the amount of heat added to the biosphere is insignificant compared to the effects of small variations in reflected solar radiation

With all this heat coming from the Sun, why don't we just heat up and vaporize? This is the other side of the energy balance — the Earth is itself radiating heat off into space. We move on now to look at the effect of small changes in this balance.

The Ice Ages

Over the last million or so years, during the Pleistocene period, the Earth has been subjected to a number of glaciations, during which ice sheets advanced from the Poles and covered what are now temperate areas. At their maximum, the ice sheets may have covered three times the area of the current polar ice sheets [Americana/ 14:698], and may have been up to 3*km* thick in parts.

There is also evidence of much earlier ice ages, as in the Permo-Carboniferous periods and at the end of the Precambrian, in the form of 'tillite' rocks of these ages. Tillites are typically produced by glacial action. These older glaciations formed part of the evidence used to support the Continental Drift theory, and they could be worth re-examining in the light of domainographic movements.

The Pleistocene glaciations were not a single episode, but consisted of a number of advances and retreats, often with interglacial periods believed to have had similar climatic conditions to now. These periods of glaciation and retreat were quite rapid on the geological timescale, measured in only tens of thousands of years. Obviously they caused appreciable movements in the isocons, with whole populations and ecologies moving quite rapidly back and forth.

The last glaciation ended only about 10,000 years ago, around the beginning of recorded history (8000 BC). The question arises whether the Earth is currently still approaching the middle of an interglacial period. If so, the observed half-degree temperature rise could just be a natural part of the cycle, unrelated to Man's recent activities. It could also be part of some other short-term cycle of unspecified origin, and could slip back again in the next hundred years.

The reasons for the cycles of glaciation and retreat are not well understood. Factors which have been suggested as involved include variations in radiation from the Sun, wobbling of the Earth's motion in orbit (such wobbling really does occur), running into interstellar dust clouds, changes in climate due to mountain building activities and injection of volcanic dust into the atmosphere, and various 'greenhouse' effects involving carbon dioxide buildup. However, the Encyclopedia Americana article cited does conclude with the words "At any rate, it is remarkable that ice ages, which are among the best-known geolological phenomena, are so little understood".

From what we have seen above, it seems that a reasonable explanation lies in consideration of the amount of the Sun's heat reflected from the Earth. The important feature is the colour of the surface. White objects are good reflectors, and poor radiators, while black surfaces are bad reflectors and good radiators.

Venus and Earth

We can get a better feel for the position on Earth if we slip back briefly to look again at Venus. Venus is in an extreme position. With its dense cover of white clouds, it is a brilliant

object, reflecting about 59% of the Sun's light. This is almost twice the Earth's value of around 30% — and it also demonstrates how greatly the reflectivity of Earth could alter.

In Chapter 15 we noted that Venus has a very high average surface temperature, around 470°C, and that this has been ascribed to a sort of 'super-Greenhouse effect' because of the dense carbon dioxide atmosphere of the planet. In fact Venus has a hotter surface than Mercury, much further in, which averages somewhere around 200°C.

We noted above that white objects are poor radiators as well as being good reflectors. I suspect that the reason why Venus has such an exceptionally hot surface is that it is such a poor radiator. It reflects close to 60% of the Sun's light, much more than Mercury (only about 7%), so on this count it would be expected to be cooler than Mercury. What keeps it hot is that it cannot radiate off the heat it does absorb.

There is a fundamental difference between the processes of solar light absorption and planetary radiation. The first occurs only on the side of the planet facing the sun, while the latter occurs all over. We will see the importance of this shortly.

On Earth, both the polar icecaps and the high clouds appear white when viewed from space. It seems possible that it is the complex interplay between these two large-scale surface features which is responsible for the hot-cold oscillations involved in ice ages and glaciations. The icecaps receive and reflect little solar radiation, because they are almost in line with the Sun's rays. Dense cloud cover is unusual at the poles, so the ice is the dominant reflecting and radiating medium there.

On the other hand, in the tropics dense cloud cover is quite common and icesheets are unusual, so cloud is the dominating reflecting and radiating surface. This cloud is subject to the full force of the Sun's rays, as it is almost perpendicular to them (Figure 17.3).

What happens when, for some reason or another, part of the icecap starts to melt? The position is quite complex. At the edge of the icecap, darker rock is exposed. This is a poorer reflector, but receives little radiation anyway. As it is darker, it will radiate better, and so rather more heat will be lost from the Earth (for the same surface temperature and reflectance, the Earth radiates equally in all directions).

On the other hand, the melting icecaps and the temporary higher temperature which caused the melting are likely to create a higher degree of cloud cover, especially at the tropics. These extra clouds will reflect back more of the intense equatorial Sun's rays, giving a cooling effect. On the other hand, being whiter, these clouds will radiate less heat off into space at night. Also, these clouds, being higher up, will be cooler than the ground surface under them, and on this count the Earth will be retaining more heat.

When the temperate mid-latitudes are considered, all these effects are competing in complex ways, tied in with the inclinations to the Sun's surface. Even the slopes of mountain ranges come into it, and as there is more land in the northern hemisphere than in the southern, and more mountains able to support glaciers, even the hemispheres are differently affected. Then there is the fact that the Earth's orbit round the Sun is an ellipse, not a circle, and it is closer to the Sun in the southern summer.....

Without attempting to provide a detailed explanation of this situation, it is clearly one which is complex enough, and which has the elements of short-term positive feedback, long-term boundary conditions, and buffer capacities in the air, sea, and land, to hold the reasons

for the observed behaviour of glaciations and ice ages.

> *Proposition 17I*
> *Cycles of ice ages and glaciations have their origin in the complex interplay of reflection and radiation from the Earth's clouds and icecaps*

This then leads us to an interesting thought. If reflection and radiation are such powerful influences in determining the temperature of our planet, might we not use them to control these temperatures as we wish?

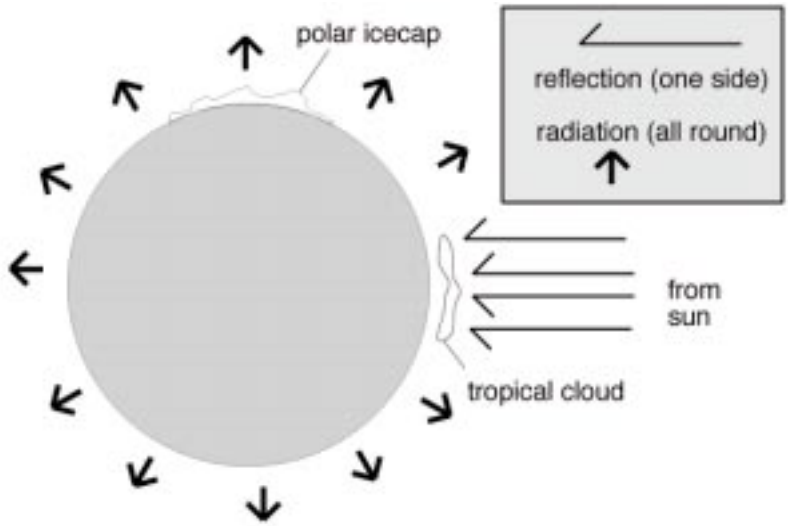

Fig. 17.3. Ice caps, tropical clouds, the Sun's rays, and Earth radiation

In fact, in the earlier article where I suggested the untapped sources of budget-neutral energy [Noël, 1983], I also suggested the same mechanisms could be used for climate control. Rafts of black vacuum balloons, or of balloons with black sheets suspended between them, would be poor reflectors and good radiators. If sited up at the poles, they would cool the Earth down, if near the Equator, they would cause it to heat up.

Silvery-coloured balloons would have the opposite effect. Moreover, the effect could be varied between one place and the next, so we could heat up the poles and cool off the tropics in this way if we wished. Or heat up the seas, and cool the land.

So, if we are really concerned about the mean temperature of our planet, would it not be more sensible to look at this or other reflection/radiation mechanisms, rather than fiddle with use of fossil fuels in a way likely to be quite inconsequential in the real scale of effects?

Proposition 17J
The temperature of the Earth or of parts of it could be conveniently controlled through the use of artificial reflection and radiation surfaces supported by devices such as vacuum balloons

We have now touched on the effects of varying carbon dioxide levels and the consequences of temperature variations on our planet. The last major dire prediction stemming from the Greenhouse Effect concerns varying sea levels.

Sealevel Changes

Once again, there is a case for considering current predictions about sealevel changes to be unduly alarmist.

In Chapter 10, when we first looked at the oceans, it was pointed out that with the evidence we had seen, comparing the positions of a piece of land relative to sealevel at different times in geological history was close to meaningless (Proposition 10A). Even in relatively recent geological times, the fact that a beach-type rock deposit formed one million years ago now stands 10*m* above local sealevel does not mean that general sealevels were 10*m* higher then.

Any extreme predictions of very rapid rises in sealevel with 'Greenhouse Effect' heating should be treated with reserve. For example, it has been predicted [Polar, 1989] that with rising sealevels, the South Pacific countries of Kiribati and Tuvalu will disappear completely under the water within the next 20 years. This is a very alarmist statement.

Many quoted measurements will, in fact, be inaccurate. Even when they are accurate, they are not necessarily meaningful. A recent television programme on the Greenhouse Effect concluded with the words "... during the last 50 years, measurements have shown a rise in sealevel along the Atlantic coast of the United States of 30*cm*. Along the Pacific coast, there has been a rise of 10*cm*".

There is clearly something wrong here. If the Greenhouse Effect really caused a rise of 30*cm* on one coast, why only a third of the rise on the other? Is it not more likely that any such rises are mixed in with domainographic changes in land levels of the same or greater effect?

It is undeniable that in an otherwise unchanged world, melting of the polar icecaps will cause a rise in average sealevels. But is the world otherwise unchanged? There are various places where ice melted or evaporated off the icecaps could be stored, as in more extensive clouds or circulating in the atmosphere, or even in higher average water tables — who has checked all those? Even long-term atmospheric pressure variations in particular parts of the globe could influence apparent average sealevels.

Nevertheless, in spite of all the above, it is quite possible, or even likely, that average sealevels have risen somewhat over the last hundred years or so. The points to be made are that any such changes are really quite small, usually much less than daily tidal variations or possible domainographic uplifts, and that there may well be compensating mechanisms

operating which will slow down or neutralize the effects of such changes. The Earth is tougher than is often claimed.

In addition, even if sealevels do rise somewhat, will it really have much effect? In Holland, more than a third of the current land surface is already below sealevel. Around the Caspian Sea, an area bigger than Britain is below sealevel. There are also large depressions below sealevel in China, North Africa, and Australia.

It comes down to a balance between rainfall and evaporation. Once again, trees can help. Since it is known that planting trees can lower the water table, they could clearly help to keep land below sealevel dry. Maybe we do not have to worry, after all.

Proposition 17K
Excessive concern over possible rises in average sealevel is unwarranted

Occam's Razor

We have come to the end of our review of the physical, biological, and mental processes operating on our Earth, now and in the past. Many of the concepts I have put forward will be new to the reader. So far I have done most of the thinking — but now the ball passes to you, the reader. Does what I have suggested make sense? Is it consistent, does it hold together? Can some of the suggestions be tested by experiment?

At the head of this chapter I quoted the analytical tool produced by the brilliant 14th century English thinker William of Occam, the 'Invincible Doctor'. This is a tool for making decisions on which of alternative theories or proposals should be chosen. It is known as 'Occam's Razor'.

The literal translation of the original Latin is "Entities should not be multiplied more than is necessary". The somewhat looser version commonly used in the scientific field is "If you are faced with a choice between two alternative explanations of a phenomenon, you should choose the least complicated one". Some more colloquial renderings might be "Don't make a Big Deal out of it", or even, "Keep it Simple, Stupid!".

I suggest to the reader that the approaches I have used and the explanations I have given have been simple ones. There has been no retreat into complex mathematics or obscure jargon, you are perfectly capable of deciding for yourself if what I have said makes sense — you don't have to take any other expert's word!

Undoubtedly the matters covered have been very diverse in every sense. But they do all relate together — every topic came in naturally as we made step after step through the Universe — and they do form a cohesive whole.

Even so, if many of the Propositions I have put forward come to be accepted, that does not mean every one of them is 'true'. In science, we try to represent parts of the Universe in theories, laws, and mind models. If these give the best, and simplest, explanation to date of what is observed, they can be taken as 'true'.

As they pass from the stage of a bright idea in one individual's mind through to being an

entrenched and undisputed part of the racial mentality, part of the 'conventional wisdom', these concepts must be open to reexamination at every stage and at any time. Occasionally a deeply-rooted concept becomes completely overturned, it is no longer 'true'. But more often it is shown that the original concept remains true, but not as universally as assumed. This is what happened when Einstein modified Newton's gravitational laws with his relativity theory — Newton remained true for most purposes, but not in every possible circumstance.

Planetary Housekeeping

Both of the words 'economy' and 'ecology' have as their linguistic root the sense of 'housekeeping'. In a very real sense, what we have looked at in this last part of the book is housekeeping on a planetary scale. We have recognized that Man's unthinking or unknowing actions in the past have caused upheaval in the house.

But I hope to have shown that if we review the position critically, we really do have the tools to clean up our house and restore it to proper order. There only remains the question as to whether we have the desire and the will to do so.

Childhood's End?

In 1953 Arthur C. Clarke, the inventor of the Communications Satellite (but better known as a science-fiction author), published a novel with the title 'Childhood's End'. In it he postulated a time in the future when the human race came of age — when it matured not physically, not in individual mentalities, but as a society as a whole, as a single group mentality.

There are hopeful grounds for believing that Man is coming of age. I admit to being an optimist, but even a pessimist would have to admit that our global concern for the planet we occupy has improved out of all recognition in recent years. Even the words we use had to be invented or redefined for our use; we have to have words for a concept before we can talk about it and develop it.

Ninety years ago, the word 'ecology' was spelled 'oecology', and had a much more restricted meaning than now, concerned with interrelationships within individual animal and plant groups — "Thus, parasitism, socialism, and nest-building are prominent in the scope of oecology" is how one old dictionary describes it.

Fifty years ago the word had virtually disappeared from use, any thoughts in the area falling in the ambit of 'environmental studies'. It is only in the last 20 or 30 years — within the lifetimes of most of my readers today — that 'ecology' has come into common use in its modern sense. With the word comes the thought and the appreciation.

Now governments in Australia and the rest of the world, governments of every political persuasion, are beginning to mobilize to create ecological improvement. The need for widespread tree planting and tackling problems of soil degradation is being recognized globally, and action has commenced. Julian Grill, Western Australia's Minister for Agriculture, was able to announce recently that our farmers are now planting more trees than are being cleared for the first time in history.

Along with the widespread new appreciation of the importance of ecological matters have

come other hopeful signs. The threat of nuclear war has receded somewhat; the cardboard patriotism of the early part of the century has gone. We are starting to regard ourselves as Citizens of Earth, with a responsibility for the whole planet, not just our own backyard.

All over the world, there are hopeful signs of political maturing. The number of dictatorships is falling, the great Communist powers have opened out to the world, beginning to see political dogma as just one of the tools available in the development of society, and not the aim and purpose of society.

The Other Earth Intelligences

The increasing maturity with which we are handling relationships between human societies has been accompanied by a pleasing increase in the maturity of our views towards other Earth creatures of high intelligence. No longer is there indiscriminate hunting of the whales. These, with their highly-developed social behaviour and their elaborate oral histories are now recognized as creatures of comparable intellect to ourselves.

Only Japan, Iceland, and Norway still kill whales, under the guise of scientific research, but in reality for economic reasons. "They eat too many fish" was the opinion of a minister in the Icelandic Government. The enormity of their crime can be appreciated if one of these nations was to start killing off Eskimos for economic reasons — "They eat too many fish".

The elephant, the gorilla, the orang-outan — all are receiving much more enlightened treatment by man, opening up a new chapter in cross-species social interaction. And the interaction is not all one way.

On the coast of Western Australia, at a place called Monkey Mia, the dolphins appear to have opened up their first Consulate to the Human Race. Their consuls arrive for extended tours of duty, interact with the humans in a very tolerant way, and might even be conducting their own experiments in getting to know us. The public concern shown for the health and sanitation conditions of this Dolphin Consulate would have been unthinkable even 25 years ago — the thought would never have entered our consciousness. But if we work at it, the dolphins may upgrade their station to full Embassy status.

Tools of Higher Learning

In many ways this maturing has been due to the physical facilities afforded by the new communications networks which are based on Clarke's satellites. When we can see for ourselves what is happening all over the world, we can truly appreciate the global picture. Communication is all-important. In a real sense, Clarke has helped to make the scenario he depicted in 'Childhood's End' come true through his invention of the communication satellite.

We are also developing other techniques, other tools of higher learning, to assist in bringing our race closer to maturity. One such tool is the synthesis technique used in this book. Another is the development of Memetics — a method of tracing the propagation of ideas and attitudes through society, using the same concepts as those applied to the study of epidemics [Henson, 1987]. There will be many more such tools, the important thing is that we are beginning to appreciate their potential value.

In this book I have applied the technique of synthesis to the physical world. The same

technique can be applied to the social world. This is not the place to do that , but I will extract one tiny part of such a synthesis — that is, that the structure of a society is not made up just of the people within it, but also of the links between those individuals.

Perhaps over half of the 'mass' of a society lies in its communications, its knowledge, its techniques. During the past the emphasis of work and wealth generation has moved inexorably over from the primary industries of farming and mining, through the secondary ones of manufacturing and distribution, and on to the tertiary 'service' industries of finance, education, and tourism. Can we look forward to a quaternary level which will supersede all these in importance, as the Earth's races mature?

We can re-make the Earth. It is impossible to restore the Earth to what it was a hundred, a thousand, a million years ago. It would be pointless to do so. But, armed with the new tools of a maturing society, mental as well as physical tools, we can make the Earth a more pleasant and fruitful planet, and hopefully avoid the fate which may have overtaken the Ostrich Dinosaurs.

Proposition 17L

*We **can** re-make the Earth*

POSTSCRIPT: SITTING BACK ON THE SOFA

"Why must I be the planetary rebel?" he asked the Flopglopple.
"Perhaps you are like me", said the Flopglopple. "You enjoy stirring things up".
"But I don't. I like smoothing things over. I like my feet high up on a sofa, eating peanuts".
"Nonetheless, you are not like the other botanists", said the Flopglopple. "I have always known this about you".

—Kotzwinkle [1985]: E.T., the Book of the Green Planet

Postscript

In some sense, I didn't write this book; it wrote itself. Or perhaps the book used me to make itself known. Like E.T., I have not sought to stir things up and produce controversial theories, but was the innocent victim of circumstances which just dumped huge piles of evidence in front of me and said "Be honest now, what is the only thing all this can mean?".

Another way of looking at it would be to say I have been the producer and director of a play, having been given the raw script, written in rocks and genes, and told to put it up in a form suitable for presentation to the public. Who was the playwright? Perhaps the Earth itself.

It has been a fascinating and absorbing job, taking up the loose leaves of each new Act, and turning them over to find surprise after subtle surprise lurking within. I hope that you, the reader, will have found some pleasure and utility from my efforts to Let the Earth Speak.

— David Noël

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COLLECTED PROPOSITIONS

(In order of presentation)

Proposition 2A: Actual rates of spread of plants are usually much less than the potential rates of spread implied by the dispersion mechanisms operating for an individual seed

Proposition 2B: Plant and animal species do not expand their range because they are unable to overcome ecological pressure from other species already occupying their ecological niches

Proposition 2C: Weeds may be controllable through manipulation of their microecological surroundings, rather than through direct attack by sprays or cultivation.

Proposition 2D: The total genetic constitution of a species is subject to continual alteration, particularly if external conditions are changing

Proposition 2E: In the absence of ecological pressure, a species diverges into two species roughly every million years

Proposition 2F: Species tend to die out when the ecological niches in which they exist are eliminated, and this elimination is promoted by continuing changes in external factors such as climate and sea-level

Proposition 2G: Changes in external conditions increase rates of natural selection and evolution

Proposition 2H: No species can maintain its genetic identity for long periods, more than around ten million years

Proposition 2I: The half-life of a species is approximately one million years.

Proposition 3A: Plants in the same genus must have had common ancestors, and these ancestors must have existed within a single area

Proposition 3B: The convection-current mechanism for continental drift lacks any supporting evidence or plausible basis, and is completely wrong

Proposition 3C: The subduction theory lacks supporting evidence and plausibility, and is completely wrong

Proposition 4A: Plant families tend to be identifiable either with Gondwanaland or with Laurasia

Proposition 4B: Plant distributions are evidence that the Expanding Earth proposition represents the situation better than the simple Continental Drift theory

Proposition 4C: The Pacific Ocean is a relatively recent formation, and was largely created after the initial formation of the Atlantic Ocean

Proposition 4D: Gondwanaland included much of southeast Asia and southern China

Proposition 4E: The Earth's current continents were once all joined together to completely cover the surface of a much smaller sphere, which has since expanded

Proposition 5A: A tectonic plate is not a real entity in any permanent sense, but only the area within an arbitrary assembly of more or less active parts of domain boundaries

Proposition 5B: Antarctica is not a real continent, but an assembly of islands, with a land area probably totalling no more than half the 14 million square kilometres usually assumed

Proposition 5C: The former megadomains of Laurasia and Gondwanaland had the same surface areas

Proposition 5D: The first major event in Earth expansion was the splitting of the holodomain in half, along the Equator, to form the two megadomains of Laurasia and Gondwanaland

Proposition 5E: The Equatorial Split which created the two megadomains of Laurasia and Gondwanaland was notable for the first surface exposure of underlying 'oceanic' material, as the overlying continental material was thinned out by past expansion

Proposition 5F: Fossils of warmer-climate plants found in areas with colder climates may have been carried there by domain movement

Proposition 5G: All areas of the Earth sciences which implicitly assume a fixed Earth must be subject to detailed reconsideration in the light of possible domain movements

Proposition 5H: In the movement of domains during Earth expansion and continental drift, smaller domains have moved relatively further from the Equator than larger ones

Proposition 5I: Peninsulas point south in the northern hemisphere, and north in the southern hemisphere, because they were formed by island microdomains moving away from the Equator and joining with other domains

Proposition 5J: Terranes are random lots of microdomains which have accreted to larger domains

Proposition 5K: Bands of microdomains are shuffling away from the Equator along the sides of continents, particularly the west coasts of South and North America and the east coasts of Australia and Africa

Proposition 5L: Microdomain movement directly away from the Equator may be somewhat distorted by the gravitational influence of adjacent megadomains

Proposition 5M: None of the present continents is a simple megadomain, all show evidence of accretion, microdomain shuffle belts, or domain re-seaming

Proposition 5N: In making Earth-expansion reconstructions, domain boundaries should be taken as the present sea-level or abutment boundaries, ignoring continental shelves

Proposition 5O: The boundaries of domains have been modified by shifts of only a few kilometres as a result of erosional and impact forces in their past.

Proposition 6A: Many cases of plants assumed to introduced to have been introduced by man, to explain their occurrence, are as readily naturally explicable through expanding-Earth principles

Proposition 6B: Actual rates of spread of animals are usually much less than the potential rates of spread implied by the mobilities of individual animals

Proposition 6C: Marsupials evolved in the Australian and South American domains when these were in contact, and were not cut back to these areas because of competition from 'more evolved' creatures

Proposition 6D: The majority of marine creatures are ecologically restricted to shallow off-shore waters, and so inhabit long ecological strips of relatively small area

Proposition 7A: In the early part of the current (Cenozoic) era, 50-70my ago, the immediate ancestors of most of our current plant genera were evolving out

Proposition 7B: This evolution took place in one or more 'equatorial bands' of physically interlinked domains extending right round the Earth, with easy spread of species along the bands

Proposition 7C: The climatic conditions in these equatorial bands were closer to those of currently temperate areas than to modern tropical ones

Proposition 7D: Typical 'tropical' plant families are of relatively recent origin, less than about 50my old

Proposition 7E: The match of a plant's current distribution pattern with other local isocons gives evidence of whether or not the plant was introduced by man

Proposition 7F: Propositions relating to equatorial flight of domains may lose validity at high latitudes

Proposition 7G: Northern Europe has a relatively low level of plant diversity because much of it was cleared of living plants through the action of glaciers

Proposition 7H: Ice-age glaciers were not centered on the North Pole, but had an area of influence displaced over into northern Europe

Proposition 8A: All mountains have been created through the interaction of domains

Proposition 8B: 'Fat' mountains have been created by domain impacts

Proposition 8C: 'Long' mountains have been created by domain rubbing

Proposition 8D: Volcanos are created by the friction between rubbing domains

Proposition 8E: Igneous rocks are produced locally, through domain rubbing, and not from a 'primeval' Earth source:

Proposition 8F: All geothermal phenomena obtain their heat components from domain rubbing

Proposition 8G: Metamorphic rocks are formed by the heat and pressure produced by rubbing domain edges

Proposition 8H: Earthquakes are the relative movements of adjacent domains

Proposition 8I: Domains are three-dimensional objects of varying thicknesses, and the surface domains which are directly observable may be underlain by other domain-type structures

Proposition 8J: It should be possible to calculate where and when earthquakes will occur, once fuller data on the domains involved is known

Proposition 8K: 'Hot Spots' in the Earth are artefacts created by domain edge movements, and not real phenomena

Proposition 9A: The Moho discontinuity represents a phase change boundary where the rocks are changing their phase in response to increasing pressure

Proposition 9B: The position of the Moho will change as the pressure of overlying rock changes in consequence of domain movement

Proposition 9C: The Earth does not have an iron-rich core

Proposition 9D: The four discontinuities marking the boundaries between the Earth's Crust, Upper Mantle, Lower Mantle, Outer Core, and Inner Core are all due to pressure-induced phase changes

Proposition 9E: All the density discontinuities within the Earth may be expected to change position as internal pressures change with Earth expansion

Proposition 9F: The core of the Earth is not especially hot

Proposition 9G: The principal source of the heat observed to flow from the depths of the Earth is friction from movement of domains, including deeper domains

Proposition 10A: Most observations and deductions on the position of sealevel relative to particular points on land today are meaningless when applied to general sealevels in the past

Proposition 10B: In earlier ages the Earth had a smaller total volume of water on its surface

Proposition 10C: The first substantial land appeared above the sea around 400 million years ago

Proposition 10D: Water is being added to the Earth's hydosphere from internal materials brought into the active domain zone by Earth expansion

Proposition 10E: The average annual fall in mean world sealevel as a result of Earth expansion is of the order of one hundredth of a millimetre per year

Proposition 10F: The average annual fall in mean world sealevel as a result of loss of water to space is also of the order of a hundredth of a millimetre per year

Proposition 10G: Most of man's evolution took place in a semi-aquatic environment, and rising sealevels have concealed most of the fossil evidence for this evolution

Proposition 10H: Geological and biological evidence explained in the past by hypothesized land bridges may be more readily explicable through domain movements

Proposition 10I: The average salinity of seawater has increased continuously for at least the last 400my

Proposition 10J: Land creatures first evolved, around 400my ago, from sea creatures adapted to seawater much fresher than that of today

Proposition 11A: The composition of the Earth's atmosphere has changed very markedly at different times in the past, and present and early compositions are completely different.

Proposition 11B: Light atmospheric gases are much more likely to be lost from Earth into space than heavy gases

Proposition 11C: Part of the temperature increase observed in going down mines stems from the same basis of atmosphere gas physics as that causing a fall in temperature with increasing altitude

Proposition 11D: The primeval Earth was never molten or at a particularly high temperature

Proposition 11E: The Precambrian-Cambrian boundary marks the time when free oxygen first became common in the atmosphere and permitted the development of oxygen-breathing life

Proposition 11F: With the development of free oxygen in the air above the seas, changes occurred in the composition of substances dissolved in them

Proposition 11G: Atmospheric ammonia was converted to nitrogen, and methane to carbon dioxide, during the course of the Paleozoic

Proposition 11H: The Paleozoic-Mesozoic boundary was marked by the disappearance of methane and ammonia as major atmospheric components, and the appearance of carbon dioxide and nitrogen in their place

Proposition 11I: Atmospheric changes at the Paleozoic-Mesozoic boundary caused a switch in the state of the seas from being weakly alkaline to weakly acidic

Proposition 11J: The Mezozoic-Cenozoic

boundary marks the time at which carbon dioxide levels in the atmosphere had fallen to trace levels

Proposition 11K: Atmospheric pressures were very much higher on Earth in the past, because carbon now present in the rocks was formerly present in the air as atmospheric gases

Proposition 11L: Atmospheric pressures were also higher in the past because the same amount of atmosphere was present on a much smaller Earth

Proposition 11M: The amount of water vapour held in the Earth's atmosphere during Paleozoic and Mesozoic times was much greater than now.

Proposition 11N: The Earth was completely shrouded in clouds at all times during the Paleozoic and the Mesozoic

Proposition 11O: Conditions necessary for atmospheric nitrogen fixing by thunderbolts were not always present in past eras

Proposition 12A: Dinosaurs as a class are not extinct, they were only early forms of modern birds and mammals. Mass extinction was limited to larger forms of these classes

Proposition 12B: Extinctions of creatures weighing over about 40kg in the last 100,000 years were mostly due to the activities of man

Proposition 12C: Countries with economies having extensive integrated tree-based industries enjoy much more stable economic and environmental conditions than those without

Proposition 12D: Man's actions over the last 100,000 years have caused major changes in the composition of animal and plant species

Proposition 12E: At the end of the Cretaceous, a species of Ornithomimid developed intelligence and civilization , caused the mass extinction of large animals associated with this, then wiped itself out in a nuclear war

Proposition 12F: Changes in external conditions close to the Mesozoic-Cenozoic boundary adversely affected the thermodynamics of biochemical /biophysical processes dependent on body size and caused the extinction of creatures heavier than about 40kg

Proposition 13A: Most coal deposits were produced by the conversion of plants which had grown up floating on the surface of the sea

Proposition 13B: Coal deposits were laid down in the narrow and shallow interdomain gulfs produced by early Earth expansion

Proposition 13C: Oil and gas deposits were formed from the remains of plants which had grown floating on the surface of the sea

Proposition 13D: The floating layers of plants which provided the source material for petroleum and coal were able to seal off significant areas of the seas and prevent normal evaporation

Proposition 13E: Seas sealed from the atmosphere with a floating organic layer would become anaerobic and foster the conversion of organic material to fossil fuels

Proposition 13F: Some salt deposits were formed by the elimination of water from sealed-sea areas

Proposition 13G: Fossil fuel deposits were formed at the bottoms of the deepest seas which then existed, from plant sources floating on those seas

Proposition 13H: The Paleozoic atmosphere originally contained much more sulphur compounds, which were largely eliminated by the start of the Mesozoic

Proposition 14A: Paleozoic coal deposits identify the sites of Paleozoic or earlier interdomain gulfs, and unlocated coal deposits should be looked for at such sites

Proposition 14B: Petroleum deposits identify the sites of Mesozoic or earlier interdomain gulfs, and unlocated deposits should be looked for at such sites

Proposition 14C: Precious metal and gemstone occurrences were produced through processes involving the frictional heat and high pressures generated by domain rubbing

Proposition 14D: Precious metal and gemstone ore deposits are formed by a natural zone-refining process, with the heat needed stemming from the friction of earth-twitches as domain edges rub

Proposition 15A: The primeval atmospheres of all the planets had a similar composition to that of Jupiter now

Proposition 15B: Saturn, Uranus, and Neptune have similar 'primeval' atmospheres to Jupiter, except that they have less of the heavier atmospheric components due to freezing or liquefying out

Proposition 15C: Mars has lost much more of its atmospheric nitrogen than Earth because of its lower escape velocity

Proposition 15D: Venus has a much higher atmospheric pressure than Earth because it has never experienced massive carbon deposition from its atmosphere

Proposition 15E: Earth has lost atmosphere through leakage via the Moon, especially when the Earth's radius was smaller and a double-planet situation was approached

Proposition 15F: Expansion of Venus is occurring in a similar way to Earth expansion, but may be at an earlier stage of development

Proposition 15H: Expansion of Mars is occurring in a similar way to Earth expansion, but is at a much earlier stage of development, with an Equatorial Girdle just emerging

Proposition 16A: Domain flight away from the equator occurs on an expanding Earth in an effort to conserve the momentum of the individual domains

Proposition 16B: Microdomains may be moving independently on underlying domains which are themselves in motion

Proposition 16C: More modern species are of Gondwanan origin than Laurasian because species development is more marked in the tropics, which are mostly parts of Gondwanaland

Proposition 16D: Both the progressive and the abrupt increases in density encountered on approaching the Earth's centre are due to the increasing pressure of the overlying material

Proposition 16E: The composition of the Earth's solid substance is more or less uniform from the centre to the surface

Proposition 16F: The acidic igneous rocks classed as Sial have been derived by the remelting of worked-over and leached basic Sima rocks

Proposition 16G: Rock of 'Sima-type' composition has extended throughout the Earth since it was first formed, and has only been modified near to the surface by domainographic processes

Proposition 16H: The Earth was never molten

Proposition 16I: All the Solar System planets and major moons have rocky centres made up of the same Sima-type material as Earth, subject to the same increase in density

with depth

Proposition 16J: All the Solar System planets were formed in the same event and at the same time

Proposition 16K: At the Mantle/Core boundary, phase III normal-matter Sima changes to phase IV degenerate-matter Sima

Proposition 16L: Planetary expansion occurs via the conversion of higher-density Sima phases into lower-density ones

Proposition 16M: Heat derived from domain movements in the Domainosphere is distributed around the Earth by earthquake waves

Proposition 16N: The Domainosphere has a maximum activity band, with a position derivable from measurements of earthquake depths and energies

Proposition 16O: The Earth is being continually heated up by gravitational massage exerted on its mass by the Moon

Proposition 16P: Planetary expansion has occurred because the nuclear forces acting between the components of the planet have become weaker as time progressed

Proposition 17A: Concern over the 'Greenhouse Effect' is misplaced, and represents a 'manufactured' crisis

Proposition 17B: Changing land use from forest to field crop or pasture reduces the amount of 'frozen' carbon to negligible levels

Proposition 17C: Fossil fuel deposits in the ground have the same magnitude of 'frozen' carbon per hectare as a dense forest, on an Earth-wide average

Proposition 17D: In contrast to field crops and pastures, permanent tree-based ecologies handle high per-hectare amounts of salt without difficulty

Proposition 17E: Removal of carbon dioxide from the air as carbonates has had a greater impact than its removal as plant organic matter

Proposition 17F: The Earth is suffering from a carbon dioxide shortage in the air, not an excess

Proposition 17G: Use of nuclear power in place of burning fossil fuels would not reduce the heat added to the biosphere

Proposition 17H: Man's influence on the amount of heat added to the biosphere are insignificant compared to the effects of small variations in reflected solar radiation

Proposition 17I: Cycles of ice ages and glaciations have their origin in the complex interplay of reflection and radiation from the Earth's clouds and icecaps

Proposition 17J: The temperature of the Earth or of parts of it could be conveniently controlled through the use of artificial reflection and radiation surfaces supported by devices such as vacuum balloons

Proposition 17K: Excessive concern over possible rises in average sealevel is unwarranted

Proposition 17L: We **can** re-make the Earth