

# Climates change, so what?

Jeremy Billington

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Remarkably, many millions of years after the demise of the once extensive forests of early primitive plants, a single species, *Homo sapiens*, came along and effectively burnt off the hydrocarbon residues in the form of coal, oil and shale deposits and so profoundly affected the brief future. Were it not true, this surely is the stuff of science fiction. The age of man, sometimes called the Anthropocene, will pass at considerable cost to all life on Earth.

The rapid combustion of hydrocarbons has added water, heat and carbon dioxide to an otherwise balanced biosphere as James Lovelock's *The Revenge of Gaia* so persuasively argues. Disturbingly, far too many people still simply refuse to believe it. Take NSW Treasurer, Michael Costa, for instance, who told State parliament in 2007: 'Climates change; if there is one constant about climate, it is that they change ...'. His response is not at all uncommon and clearly demonstrates a limited science education and undoubtedly almost no knowledge of natural history. As the American physicist, Lawrence Krauss noted, a 2001 National Science Foundation survey of scientific literacy among US adults, for example, found that 50 per cent could not say for sure that the Earth orbits the sun and takes a year to do it. Doubtless the same could be said for Australia. Serious action on reducing carbon emissions particularly in Australia is simply not happening despite increasingly hot annual average temperatures, bushfires and disruptive floods.

## Why pulp mills

From a purely ecological or Gaian perspective there is a balance between the optimum mass of plants across the planet and the amount of oxygen they liberate and carbon dioxide they absorb, but no one knows quite what this might be, which may explain why pulp mills easily attract investors. It also demonstrates why the climate is changing on our ailing planet. As a crude analogy, when CO<sub>2</sub> levels

rise in circulating blood the acidity increases, stimulating deeper and faster breathing.

Plants capture both oxygen and carbon dioxide (plus a few others) and conveniently transform them into heathlands, mangroves, savannas, jungles, woodchips, diatoms, sugars, leaves, bananas, green tea, wine, tomatoes, plus other things. How much carbon plants can store seems to depend upon their age, air temperature, cloudiness, rainfall and time of day; routinely plants and flowers are removed from recovery rooms in hospitals at night because that's when they soak up oxygen.

Plants are less able to absorb CO<sub>2</sub> as the atmosphere has warmed and are exposed to some thirty per cent more CO<sub>2</sub> than they were in pre-industrial times. Interestingly, the rate of photosynthesis has increased but only to a certain point beyond which plants become poisoned, writes Graham Lawton.

## Unknown effects

There's another catch to this grim story with atmospheric warming: the proportions of other elements in plants, including nitrogen, phosphorous, sulfur, magnesium, iron, zinc and manganese all drop significantly and again no one really knows what this may mean for all other species of plant and animal.

Recent work by John Kanowski at Griffith University (see Lawton), for example, shows a significant drop in some elements absorbed by the Queensland maple, *Flindersia brayleyana*. He says: 'It seems surplus CO<sub>2</sub> levels within limits in the atmosphere enable plants to grow like the clappers, but such plants do not contain sufficient amounts of minerals, which like a child fed on potato chips, lolly water and sweets never fully develops.' Clearly, we all intuitively accept the balance of nature yet when presented with this hard-won data we refuse to do much about it.

Photosynthesisers and respirers across the planet are intimately connected. Their metabolisms are complementary and have been

almost since life began — co-evolution in its broadest sense, Gaian most certainly, yet we hominids are resurrecting a theatre of life whose actors long ago exited the stage, and by that I mean all the potential energy those forests carried to their graves. With the rise of agriculture humans began their earnest assault on the great oak, elm and beech forests of Europe about seven thousand years ago. The Earth's water balance is now seriously upset, category five hurricanes queue in the northern hemisphere and extreme fires are becoming commonplace — the climate is changing but for most of us it's business as usual. Ecological stability is now far too dangerously dynamic and the fossil record suggests it's these wayward and extreme

events in Earth's long history that have punctuated evolution (Niles and Gould 1972); the Anthropocene period is the beginning of the Earth's sixth great extinction.

### **Obliterating the cradle**

Never has Earth needed trees more than now. Their removal continues alarmingly across the planet and ironically their crash is largely accomplished using hydrocarbon energy not the sweat of men with bulging biceps and axes and is already far in excess of anything our predecessors or any other species alone could have physically managed. Yet to defend the forests still attracts derision, as though humans really have no need for so many trees



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anymore. E.O. Wilson wrote in 1992 that humans had destroyed slightly less than half the total rainforest cover since prehistory. Elephants have always been tree-fellers and perhaps five million years ago the extinct Australian tree-feller, *Palorchestes*, was too. It's ironic that our hominid ancestors evolved arboreally, became terrestrial bipeds and ever since have manifested a mother-child-separation-neurosis by obliterating the cradle of their evolutionary origins — the forests. Stereoscopic and colour vision, the opposable thumb, powerful hind limbs and an enlarged brain were conceived among the branches. Evolutionarily, our nearest living relatives, the great apes, have never been our ecological competitors as were our hominid precursors, but gorillas and chimps have now become bush meat and the homeland of the wild man of Borneo is tragically shrinking to be replaced by oil palm plantations.

### **Misuse of fire**

Let's not overlook our ancient and continuing use of fire fuelled by extant plant material. We are the only known species (Sawyer and Deak 2007) to consistently and opportunistically use fire. Our ancestor *Paranthropus*, in Kromdraai (South Africa) or Peninj (Tanzania), whose hearths and two million-year-old remains palaeoanthropologists found, were the first; but now there are 6.7 billion humans and each is potentially able to make fire and burn fossil fuels!

In tropical Australia, there has always been a massive misuse of fire, even the black kite *Milvus migrans* occasionally contributes by snatching a burning ember and dropping it onto unburnt grass. Fires in Australia now sweep wholesale across areas once protected by marshes, forests and billabongs. Foresters and pastoralists demand a reduction in undergrowth or 'fuel', as they provocatively call it, by controlled burns that rarely are, sending yet more carbon and important minerals into the sky as oxides, oblivious to the insidious loss of this water-retentive matter that gardeners know as mulch. Irrigation pipes today criss-cross the arid outback like mats of fungal mycelia taking hydrocarbon-powered water from here and putting it there and across the globe, trillions of times over, giving us strawberries in summer, lakes of wine and hail as large as cricket balls. The global and multi-billion dollar industry that irrigation has become in two decades is surely as profound and serious a contributor to climate change as is the massive and out-of-control production of carbon dioxide by

fossil-fuel burning? How can Earth possibly not but respond violently to this mounting assault by our species?

Bear in mind, too, that we've eliminated so many other species whose opinions were never sought in this one-sided state of affairs. Ernest Haeckel defined the term 'ecology' in 1869. His definition emerged about a century after the Duke of Bridgewater had dug a 40 mile stretch of artificial waterway, to ship coal from Worsley, Lancashire into Manchester to feed the great engines of industry — effectively the beginnings of the Industrial Revolution. If Haeckel could have foreseen today's now regular flotillas of bulk coal-carriers floating menacingly off Australia's east coast, he would surely have substantially modified his ideas.

### **Finite resources**

Ecological journals (try *Conservation Biology* or *Ecology Letters*) are replete with papers describing the retreat of species to higher elevations and ecosystem collapses yet it's probable not a single Australian politician or other 'well-dressed thief' has ever read one (or could). Economists and ecologists use similar concepts such as resources, waste, thrift and so on but economists' abysmal science consistently overlooks the finiteness of Earth's resources and the commensurate destruction *that* borrowing leaves. Economists delight in telling us that there's no such thing as a free lunch.

Humans now harness hydrocarbons like they once did a team of horses or slaves and put them to nearly every conceivable physical task, or as Thomas Homer-Dixon put it, 'three tablespoons of crude is the equivalent of eight hours of human labour' or 'a car-full of petrol equals two years' of human sweat', but we are not talking about a *few* cars or tribes. Hydrocarbons have steered our biological and cultural evolution in recent centuries but we have been too profligate and increasingly reliant on them. We've become addicts and find it inconceivable that to continue will undoubtedly destroy civilisation. Humans are now confronted by an exquisite choice in their evolution like no species before: continue to burn fossil fuels and bring civilisation to its knees most likely this century, or start physically doing much more for ourselves. If the latter happens, slavery again will become commonplace.

The heat of industrialisation today across the planet is unprecedented. When Herodotus wrote his *Histories* two thousand years ago humans and beasts of burden

performed physical work using the energy derived from food grown at that time and generally from that place. Two centuries ago our continent supported perhaps half a million hunter-gatherers whose lifestyle was plausibly ecologically sustainable; the damage inflicted on the Australian landscape by burning and the loss of megafaunal species as a consequence was undoubtedly profound, whereas today's grand folly has a global reach.

Nothing in the fossil record suggests another species caused such massive and wholesale ecological damage as we do today. Hydrocarbon dependency has enabled us to leap well clear of the natural and therefore slower processes that have shaped the evolution of the planet. In the modern era wars are waged over the rights to fossil fuels. Agriculturally we can sew GM seeds into our tractor-ploughed soils; water and protect fruit from frost with irrigation and pumps; repel pests with hydrocarbon derivatives; harvest, bale, sort, package and fly or float produce to anywhere on Earth. With the flick of a switch we can hold back the night, nudge tectonic plates by splitting atoms and blow apart coal and gold seams, transport uncountable numbers of other species far from their the place of evolutionary origin, yet the climate sceptics fail to understand that this is the *fastest* form of living. Building the Great Pyramid in Cheops four and a half thousand years ago required 2,300,000 blocks of stone, each weighing on average about two-and-a-half tonnes, but not a single tank of petrol was used. This work must have put an excessively heavy strain on the economy, because it was never attempted again — pyramid building by the Egyptians surely marked the departure from the uncertainties of hunter-gathering and a welcoming of civilisation.

## Vision of Mars

The modern bulldozer epitomises this concept of creeping normalcy. It's almost become social and on the Sunshine and Gold Coasts can be seen working in herds, their mahouts sitting in air-conditioned comfort,

connected by cellular phones and the internet. They rub out a hill in a few days, laser-level the landscape to the setting sun; yoke a pair of bulldozers with a chain thick-as-a man's-waist and a woodland vanishes in hours and what do the climate sceptics do? Pop smoke rings at each other!

Atmospheric carbon dioxide concentrations now stand at 450 parts per million, reports Fred Pearce from the Bali Climate Conference in December 2007 and there remains uncertainty about just how much higher the annual mean global temperature might actually go at this level and importantly what it could do to Nature's balance. Before the industrial revolution the concentration stood at 280 ppm (Flannery 2006). Human civilisation and all extant life on Earth has never before evolved in atmospheres of such (dis)proportions, which can only mean that to abandon the principle of precaution could prove suddenly fatal. Perhaps our umbilical connection to Mother Earth via hydrocarbons is more than just metaphor. Finally, have you like me scanned those remarkably clear images of the planet Mars' surface and wondered, what if the next Mars rover should scrape away a few metres of dust to reveal shapes vaguely reminiscent of motor car chassis, irrigation pipes or even leaf-blowers? ▲

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