Climate Change!

Last issue we had something to say about (what we think is) the "man-made Climate Change" farce.

We don't question the fact that the climate is changing, it's been doing that since time immemorial, what we question is; "is it certain that we are causing the change"?? Perhaps naturally occurring things like solar flares, volcanic activity, sun spots, shifting tectonic plates, variations in the earth's orbit etc might play a part?? We don't know, but we reckon there's every chance that King Canute will stop the tides before man speeds up or slows climate change.

It's been drummed into us that during the northern summer of 2007, the amount of ice coverage in the Arctic was as low as it has been since observations from space began 30 years ago. But not this year – this year there was more ice than last year, but no one has mentioned that. The amount of Arctic sea-ice had been decreasing since 1979 but what is not understood is why this has happened. The overall temperature of the planet rose slightly from the year 1970 to year 1998 but in 1998 it stopped rising, stayed steady for a while and has decreased every so slightly every year since 2001. Because the second fact does not compliment the first, it is discarded and we're told that "as the ice is melting, the earth is warming". Amazing!!!

A similar temperature variation period occurred early in the 20th Century. Between 1918 and 1940, a period of warming occurred followed by a cooling period between 1940 and 1965. This does not fit the "mould" as the 1918/40 warming period occurred well prior to world industrialisation and the cooling period occurred at precisely the time that human emissions were increasing. It will be interesting to see where we are with temps in the year 2015.

It seems, to us, that there just isn't a balanced discussion on the matter, we are being constantly fed propaganda from self-interested NGO's, media, industry and political pressure groups that all look to benefit from having and maintaining a robust "Global Warming Industry". Some people now genuinely believe that if they turn their lights off, the barrier reef will be saved. What a lot of hog wash!

If one dares to argue the opposite side in this argument he/she is immediately branded a climate sceptic.

We asked if anyone had any different ideas, to ours, on the subject. We're glad to say that Frank Alley saw our 'rant' and he's taken us to task.

Here's what Frank said.

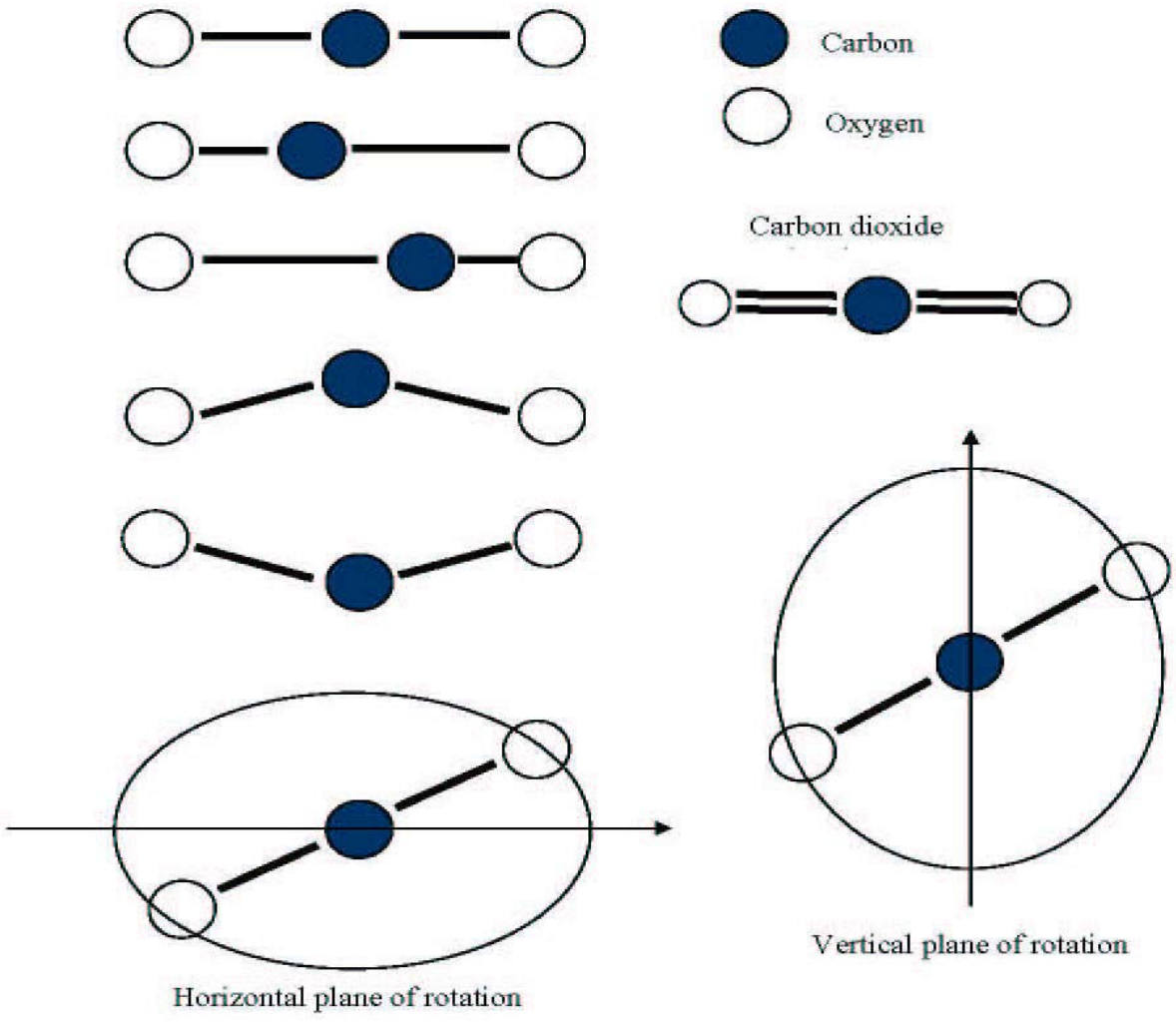
Global Warming?

This essay is my response to Trevor's request for views on the matter of global warming. It is in two parts, the first concerned with some basic science of thermodynamics and spectroscopy with a little chemistry. The second concerned with the legitimacy of argument being used in this all-important public debate at the moment and a brief canvassing of alternative power sources.

The Role of Carbon Dioxide in Global Warming

The CO_2 molecule is able to absorb kinetic energy in a number of modes of vibration and two modes of rotation as shown below. That CO_2 is a greenhouse gas is dependent on the resonant frequency of the chemical bonds between the carbon and oxygen atoms. The bonds between atoms in all molecules are in constant vibration and the rate of vibration is dependent on length and energy, not unlike that in radio antennae.

The CO_2 molecule has double bonds between the atoms, as shown in the diagram below.



Not all gaseous molecules are greenhouse gases because the bonds do not have the right resonant frequencies. Oxygen and nitrogen are not greenhouse gases, but they do absorb kinetic energy from collisions with CO_2 molecules and thus there is an increase in the temperature of the atmosphere. The number of degrees of freedom of vibration will depend on the complexity of the molecule.

Molecules such as the refrigerant gas freon ($CFCl_3$) and methane (CH_3) have many vibrational degrees of freedom and are very strong greenhouse gases. There can be no more than three rotational degrees of freedom, as there are only three spatial dimensions. A linear molecule such as CO_2 can only have two rotational degrees of freedom.

So what is all this stuff about degrees of freedom? When energy is put into a molecule the principle of 'equipartition of energy' applies and what energy is available is equally shared between the degrees of freedom. So if there are say 100 units of energy and there are 5 degrees of freedom available, then each degree of freedom gets 20 units of energy. The point about all this is that the more degrees of freedom there are, the more energy can be absorbed by the gas.

In just two days, tomorrow will be yesterday. Nana V.

There is another problem with CO_2 in that it is soluble in water (those nice bubbles in your favourite brew are dissolved CO_2). It forms an acidic solution, which can dissolve carbonates to form soluble bicarbonates (hydrogen carbonates). Coral is made of calcium carbonate and oceanographers and marine biologists are becoming increasingly concerned by evidence they are now seeing of changes in the ecology of the oceans and therefore the balance of life there. The pH of water has an effect on what species can exist successfully in the aqueous environment.

Lest you think that it is not so important, remember the destruction caused by prickly pear, the introduction of rabbits (before Telstra's Great Wall of China of course!) and cane toads into ecologies, which had not evolved with their presence. There are endless cases around the world of such environmental damage due to well meaning, but thoughtless and/or ignorant actions of humans.

One side effect of global warming is that the vast Arctic permafrost is beginning to thaw. When it does, it will begin to release into the atmosphere sequested CO_2 from the Jurassic period, from the period 150 to 200 million years ago. The new study highlights concern about emissions of greenhouse gases from thawing soils. 'Permafrost may hold 30% or more of all the carbon stored in soils worldwide. As the permafrost thaws, it could lead to large-scale emissions of methane or carbon dioxide beyond those produced by fossil fuels.' There will also be a contribution to rising sea levels. More reading: HERE and HERE.

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Heat Energy.

In the history of Physics (Natural Philosophy), there have been some spectacularly successful theories. We can include in these the theories of Galileo, Newton, Maxwell, Faraday, Einstein, but particularly the theories of the scientists who worked in Thermodynamics. Thermodynamics is the most fundamental of all science. It is the most successful science of all. That you enjoy driving your car and the success of your car's engine and its efficiency is all down to Thermodynamics.

It is also the most difficult science to understand with mathematics to send your hair grey. All scientific theories are open to adjustment as more is discovered and there is nothing wrong with this because scientists are NOT so pedantic and inflexible.

The great success of science is that it has in its discipline, the ability to disprove incorrect findings. That cannot be said for other so-called 'sciences'.

Heat exists in two forms:

One is kinetic energy, the energy of moving matter. When you apply the brakes on your car, the kinetic energy that is lost as the car comes to a halt is converted to heat energy in the brakes (energy cannot be created nor destroyed…first law of thermodynamics). The brakes get hot because the steel atoms are caused to vibrate faster in their crystal lattice. If you touch the hot steel, the vibrating atoms transfer kinetic energy to atoms in your skin and the heat sensors in your nerves. Other forms of kinetic energy include sound (vibration). Vibration and rotation in a molecule can be transferred to motion (translation) and collisions between molecules (equipartition). The question now remains how does heat get into the bonds of the CO_2 molecules?

Heat also exists as electromagnetic radiation. This was well understood in the 18th century and very little needed to be learned about infrared radiation since then. What has proven useful is the study of spectroscopy (my own research field) in which certain frequency bands of electromagnetic radiation are used for chemical analysis.

We have all experienced the pleasure of sitting in front of a fire with your favourite drop in hand on a cold night, feeling the heat radiation, invisible, but there. What we are feeling is infrared light. Our skin has detectors, which are able to resonate at the frequency of infrared light or a wavelength of around 800+ nanometres. The radiation

causes an increase in kinetic energy in the nerve cells in our skin and that is manifested as warmth.

Now a little simple chemistry:

Good Australian coal has a content of about 80% to 90% carbon. So, 100 tonnes of coal has about 80 to 90 tonnes of carbon.

A simple chemical equation:

Carbon + oxygen produces **carbon dioxide.**

Or

C + O_2 → CO_2

12 tonnes **Carbon** + 32 tonnes **Oxygen** gives 44 tonnes **Carbon dioxide**

That is:- 24 million litres of CO_2 from one small truck load of coal, approximately (using Avogradro's Hypothesis).

Multiply that number of tonnes of coal by multiples of millions and consider the concept of equi-partition of energy.

A gentleman is one who knows how to play the accordion . . . and doesn't. Nana V.

When I was a kid learning science at school, we were taught that the atmosphere had 0.03% carbon dioxide. It is now approaching 0.04% and that represents about a 30% increase in less than my lifetime. That also represents a 30% increase in the heat absorbing capacity of the atmosphere. The planet Mars, has a low atmospheric temperature because it has no greenhouse gases. Venus has a scorching atmosphere because of excess greenhouse gas content in its atmosphere. The Earth has been able to support life in the narrow, but necessary temperature range because of just the right amount of CO_2.

Life on the earth is dependent on a set of finely set parameters. The temperature range has to be right, as has the oxygen/nitrogen mix, as has the gravity force, as has the carbon content as has the general chemistry of the planet. In fact the universe's existence rested on a fragile Fine Structure Constant in which the ratio of the electric force to the gravity force had to be just perfect. If the gravity force had been just a little stronger, the universe would not have expanded, stars would have collapsed and there would have been no planets, if a little weaker, stars and therefore planets would not have formed.

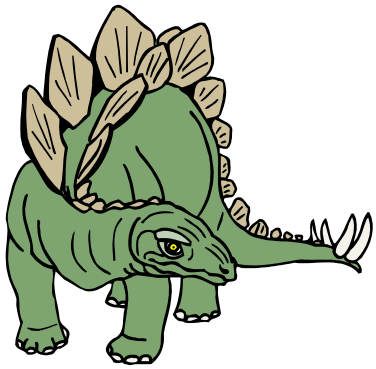
If the electric force had been a little weaker, atoms would not have formed and there would have been no atoms and therefore no chemistry and therefore no life.

Likewise, if the electric force had been a little stronger, chemistry, if at all would have been vastly different, all structure would have been different. Existence is all a fine balance.

There is no doubt that humans can exist in a wider range of temperatures than many species simply because we can control the environments in which we live and work. The same cannot be said for the weather or the climate.

One of life's mysteries is how a two kg box of chocolate
can make a woman gain five kg. Nana V.

A few decades ago we were all in fear of a nuclear war between the US and the USSR. Scientists from both sides got together and did some computer modelling and what they found was that if there were a nuclear war, there would be a fall in atmospheric temperature due to a partial blotting out of the sun's light. The result of this would be the loss of most life if not all life on the earth within a year due to the rapid reduction in plant growth. There would be widespread starvation for both animals and humans. They also predicted extraordinary climate change. It is after all what caused the demise of the most successful group of species in earth's history, the dinosaurs (no group of species survived longer). Incredibly, in view of what is happening today, no one questioned the scientists computer modelling! Both sides of the political divide accepted the lunacy of nuclear war in terms of the end result, not being winning or losing in the short term, but the destruction of all life. In 30 years computer modelling, like computing, has made enormous advances, but now the skills of the scientists, mathematicians and computer experts is being questioned. You might well ask why.



Scientists are not perfect and amongst them are charlatans, liars and cheats who are exposed by other scientists, qualified to do so. Within the profession of the sciences there is plenty of ambition and jealousy, just like in any profession. Scientists are very wary about publishing their findings because those findings will be carefully scrutinised by peers. It is called peer review and it is why science is and has been so successful. There is no conspiracy to defraud the people in modern times, except in those cases when corporations have paid scientists to fix results to cover inconvenient truths. What happened with the tobacco industry is a case in point, where scientists had been employed to refute claims that tobacco smoking leads to higher risks of lung cancer and other diseases. It is worth noting that in so many cases the scientists involved had no medical training. It is much the same with the climate change-denying scientists, most of whom are not climatologists and a few of them are the usual suspects who had been once employed by the tobacco industry, but are certainly financially better off now.

This is how science is done:

A hypothesis is proposed. Research is done, by either looking at the relevant literature (particularly that of other researchers in the field) and/or by doing experimentation. Results are processed, experimental errors are assessed and dealt with. All relevant evidence is evaluated (including contradictory evidence). Eventually, on balance, conclusions are drawn. The work is published only after review. It will not get published in any reputable scientific journal unless it has been carefully checked. A lot of research does not see the light of day because it fails peer review.

This is how science should NOT be done.

Start with a conclusion (such as global warming is not occurring, or humans did not evolve from more primitive species) then, look for evidence that supports that conclusion, whilst ignoring all other evidence. This is the stuff that never, repeat never, gets published in reputable scientific journals, which use the system of peer review. Extracts might get published in the tabloid press, in scandal rags or on commercial television or by interest groups with an axe to grind.

This is garbage science and that is why legitimate scientists will not enter into debate with the denialists, who are in a very small, but noisy minority. For example, The Australian newspaper has been conducting a campaign of climate change denial for over a year and continues to publish letters from correspondents who continually trot out the same old lies and propaganda. Their latest bit of nonsense is that there is no net ice loss in the Arctic, despite satellite photographs to the contrary. The paper publishes very few letters in opposition to its position, but it does have a letters blog and its favourite letter writers get a real hiding from some really well-read bloggers, one of whom is a scientist:

This is one of his blogs: 'Temperatures over the Antarctic have risen at between 0.05-0.15 degrees C per year over the last 26 years (giving a total rise of between 1.3-3.0 degrees over 1970 levels); Average Annual Global Temperatures are around 0.42 degrees C warmer than the 1961-1990 average-and a clear 0.2 degrees warmer than they were in 1999-2000; Even 1km-5km above the surface of the Earth, temperatures are between 0.1 and 0.4 degrees warmer now than they were in 1999-2000; Arctic Sea Ice has fallen from almost 7 million square kms in 1980 to 3.5 million square kms in 2007. Now, as a scientist I recognise that none of these things-separately-prove the existence of Man-Made climate change. Even together I don't accept them as ABSOLUTE PROOF. However, coupled with what we know about the release of CO_2 into the atmosphere-and the drop in solar activity over the last decade-I take these things together as being STRONG EVIDENCE for the very real possibility of man-made climate change.

Now, the denialists can DENY the evidence presented to them all they like, but common sense and the precautionary principle suggests that we start acting rationally and adjust our behaviour

to avert the possibility of disaster. That this adjustment involves reduction of waste and inefficiency in how we both produce and use energy and that doing so may require structural adjustments for Big Business is what has the likes of the CIS, IPA and the inappropriately named Australian Environment Foundation so up in arms.'

One of the bloggers who supports the denialist position claims to be a scientist but doesn't even know what a science degree is! He claims to have a B.Si !!!!!!!! I'm sure he means B.Sc. For me the denialists as represented by dills like this, simply have no credibility. However, there is one climate change denier who writes to the Australian and is always published; he is the Professor of Geology at a university in Queensland and always signs his letters Professor…. in an effort of course to give himself credibility, but the problem is that he simply has no qualifications nor experience in climatology. He gets the usual support from the usual suspects who never provide any evidence for their supporting statements (usually 'good on you Fred, I agree with you Fred etc…), but he also gets a hammering from other bloggers who point out his inconsistencies of argument and his lack of relevant expertise whilst offering evidence and references for further reading.

I have yet to see a letter published in any Australian newspaper from a climatologist claiming that climate change is not occurring. On the contrary, the qualified climatologists at CSIRO and other places like our universities are expressing concern about the future and lack of action. Indeed, they are now saying that things are worse than the computers modelling has shown up to now. I would be happy to be proven wrong about this.

Having said all that, let me say that in no way do I claim to be an expert. All I can claim is a legitimate university degree in science (two majors, physics and chemistry), some research time at university and a long time interest in modern physics, not to mention a passion for the history of scientific thought. So much is known and understood now, that no one person can have a complete handle on any one area of knowledge. It is so complex, that research is now done in teams with experts in their fields taking responsibility for different areas of the project. I suppose the greatest example of this in the past was the Manhattan project where teams of engineers, chemists, mathematicians, technologists and physicists built the first atomic bombs. These teams and others like them developed something that eventually saved us from all out warfare (balance of terror), but could have led to destruction of all life. Today we have teams of experts looking at ways to save life on the planet. In the early 70's, the American biologist Paul Ehrlich warned the western world of what he called 'the cowboy society', the throwaway society, and that was nearly 40 years ago.

The economists of the day were really offended by Ehrlich and had scientists the world falling off their chairs, doubled up with laughter when they asked 'what if the second law of thermodynamics is wrong?' Remember I said that the most successful laws of all were those of thermodynamics. To trivialise the laws:

First law: the best you can do is break even.
Second law: no you can't, you always lose.

In other words, energy is always lost and in the end you lose, you simply cannot continue to rip out of the earth and continue to 'grow'; there has to be a tipping point. After the tipping point there will be global turmoil the likes of which the world has never seen. I'm afraid that many people in all advanced countries have heads planted firmly in the sands and are refusing to look.

You know the old saying…'there is none so blind as he who will not see.' When I was about 25 I said that if there were to be a world war in my lifetime, it would be over Middle East oil. I still believe that it is all so unnecessary because there is a resource, which remains available for about another 4.5 billion years and it is free…the Sun. And talk of the technology not being available is at best out of date or is at worst, simply a lie. A Chinese engineer who has become the richest man in China did his PhD at the University of NSW in Sydney. He developed a new method of producing silicon solar cells which were cheaper to make and more efficient in converting sunlight into electricity. He tried to get backing for production in Australia; the Howard government was not interested and local businessmen would have nothing to do with him because he was Chinese, that's right, they did not trust him. He went back to China, he is now feeding electricity into the provincial grid in China, running his own factories with is own electricity and exporting the cells to Australia and other countries. Things are happening here in Australia:

And private enterprise has now finally cottoned on to what many have been saying for some time, there is money to be made in the new technologies, and in other places.

Professor David Mills of Sydney had to leave Australia because he could not get backing of his solar steam power generation scheme. He is now is California, will become a multi-billionaire and California will be able to close down more coal burning power stations. This scheme does, repeat does, provide base load power, so dispensing with another lie from the anti-solar power lobby. Read about it here

You worry about not being to have your 4WD cars in future where petrol/diesel will be unavailable or too expensive. Fear not. 4WD's and other cars will run perfectly well on hydrogen and the exhaust gas will be water vapour. You can get hydrogen from the electrolysis of water and the electricity needed can be supplied by solar sources. It's a matter of change and provision of infrastructure. The science is known, the technology is available, waiting to be used.

For example, here is a picture of a Ford Exploder (sorry, Ford Explorer) running on hydrogen. You can read more about it here:

Those opposed to the use of alternative technologies for the production of electricity like to use the tactic of insisting that power has to be generated by only one of the alternative power sources. Those of us in favour of using alternatives, talk of a mix of technologies, a mix appropriate to the areas in which they are employed. Coal burning stations might be part of that

mix as might be nuclear, but the essential point is that reduction in the production of CO_2 is essential. Already, the bogyman China has a higher percentage of renewable power sources in its power-production mix than Australia does. What is stopping us in Australia doing the same? I have taught courses highlighting the different technologies available for electricity production, some still to be further developed. The technology is available, but seemingly in certain countries the political will is not there. There is great inertia to change where big business has made investments over the years and fears reduction in profits.

Alternative sources include:

- Hydro-electricity (a bit of a problem in Australia with reduction in rainfall)
- Geo-thermal power generation (vast reserves in Australia)
- Direct solar to electrical energy conversion (vast opportunities in Australia)
- Solar/steam power generators (vast opportunities in Australia)
- Nuclear power (not politically viable for Australia)
- Fast breeder nuclear power stations (not proving to be as successful as hoped)
- Nuclear fusion reactors (so expensive, no one country can afford to build one)
- Wind turbines (already successful in many parts of the world)
- Tidal barrages (some experimental stations in operation in Europe)
- Wave power stations (still in development)
- Natural gas powered stations (in Oz we sell our vast supplies cheaply to the Chinese, cars will also run on NatGas)
- Biofuel generators (more suitable to small installations)

The obvious problem with sunlight is that it is free. No corporation or government owns it and there is no money to made from its supply and nor are there any wars to be fought over it.

It is perplexing that many people who have little or no training in science become critical experts when it comes to the sciences of evolution and climatology, yet are happy to unquestioningly accept and live with the benefits of the sciences of electronics, medicine, communications, transportation, architecture and town planning, engineering, astronomy, aeronautics, the different branches of biology, genetics, food technology and other chemistries, pharmacology, nutrition, statistics, mathematics, actuarial studies, psychology, sociology and other disciplines too numerous to list. It is fundamentally the same scientific method, which forms the basis for all these areas of study.

Jacob Bronowski, a mathematician who worked in the Manhattan Project, presented a TV series called ‘The Ascent of Man’. One chapter of the series was titled ‘Knowledge or Certainty’ and introduced the viewer to modern physics and the Heisenberg Uncertainty Principle, which he called the ‘Principle of Tolerance’. In this episode he alluded to the Nazis and the holocaust (he was a Polish Jew) and said he had no trust of people who just knew that they were right, without any hint of uncertainty.

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Survey

Well, you know where we stand, and you've read Frank's response, now we'd like to know your thoughts on the climate change matter, you can have your say HERE . It's just a quick little poll, No names,. No pack drill. It's requires just a quick Yes/No answer.

We'll publish the results next issue.