

# With every step you take, every breath you make

- A major greenhouse gas that [we] dare not speak its name
- But it's a gas that is all set to be a 'nice little earner'
- **PLUS: Info on the 'Fact or false? Global Warming Wager'**

Every day every human emits 2½ litres of flatus, a 20th of which is methane (CH<sub>4</sub>). In the course of a year the world's 6½ billion people collectively effuse 300 billion litres of CH<sub>4</sub> or expressed another way, some 200,000 tonnes of this greenhouse gas.

Not only is methane a greenhouse gas but it is, so the IPCC's scientists claim, 70 times more effective than carbon dioxide (CO<sub>2</sub>) in bringing about 'global warming'. We humans, however, also generate prodigious amounts of CO<sub>2</sub>. Every day we each, on average, exhale some 15,000 litres of air, five per cent of which is carbon dioxide. During a year we each breathe out 500 kilogrammes of CO<sub>2</sub>; 6½ billion times this amounts to more than 3 billion tonnes.

By doing no more than effusing and exhaling we are directly responsible for putting all but 3½ billion tonnes of CO<sub>2</sub> (and CH<sub>4</sub> equivalent) into the Earth's atmosphere every single year. This amount represents more than 10 per cent of the total global output of carbon dioxide. By the time the world's population has risen to 7 billion, an extra 300 million tonnes of CO<sub>2</sub> and CH<sub>4</sub> will be entering the atmosphere annually as a direct consequence of our eating and breathing.

Conversely, as humans have always effused and exhaled at a constant rate, it implies that over the past 60 years, during which time the world's population has trebled, the level of human bodily emissions of CO<sub>2</sub> have also risen accordingly: from a billion tonnes a year to its present level.

Although figures for the volumes and rates of increase of carbon dioxide in the atmosphere aren't wholly reliable, the contribution made by direct human bodily emissions of CO<sub>2</sub> are not only significant but do not appear to be taken into consideration by those concerned in assessing its impact on 'global warming'.

## **WHAT IS TO BE DONE TO ELIMINATE OR AT LEAST LESSEN THIS MAJOR SOURCE OF MAN-MADE GREENHOUSE GAS?**

Reducing the human population back to the levels of the 1950's is one solution. This, though, is likely to meet with opposition. An alternative, albeit a partial one, is to halt the production, sale and consumption of excessive 'flatus generators' such as Brussels sprouts, [f]artichokes and pulses (especially soy and haricot ['baked'] beans, a 400gm can of which generates a litre of flatus). This, however, is certain to be met with even fiercer resistance from farming and food processing interests. Nonetheless, there is a way of overcoming even this entrenched intransigence.

If the 'Warriors Against Warming' (WAWs) promoted publicity campaigns advocating abstinence of these 'excessive flatus generators' (EFGs) - such as: 'Beanz Meanz Fartz' - they are sure to bring a wider awareness of the consequences EFGs pose to 'global warming'. Similarly, WAWs, in publicly announcing their own personal renunciation of consumption of EFGs, will bring further momentum to the removal of these foods.

Naturally, if such commitments were forthcoming not only from WAWs but all of those actively engaged in pledging their commitment to reducing mankind's collective 'carbon footprint', then the production and consumption of these EFGs is sure to fall yet further. These, of course, include all of the companies and organisations which, in their pronouncements and advertisements proclaim their commitment to being 'green'. If every person in the media who advocates the need to stem the rise in greenhouse gases also declared their abstinence of EFGs the campaign would gain yet further momentum.

However, if those politicians, from Al Gore and Gordon Brown to local councillors who assert that they are also WAWs, pronounce that they too are forsaking EFGs, then the eradication of these foods is sure to swiftly follow. (The corollary of course, is that if any of these luminaries fail to publicly proclaim that they are also doing their own personal 'little bit' in cutting back on their effusions of methane, they will risk having their pronouncements on greenhouse gases perceived as cant and their personal standing as that of a hypocrite).

## **ONLY THE FIRST STEP, THE NEXT ONE IS...**

Although the removal of EFGs from the food chain will help slow the rise of man-made greenhouse gases, it will still represent no more than a fraction of the methane we humans effuse into the atmosphere.

What is needed is a way of entrapping all of this gas. Fortunately not only is there indeed such a way of doing so but there is no reason why all the effusions cannot be recycled. In Britain alone this will amount to more than 5½bn litres annually (some 7,000 tonnes, 6 million cubic metres, the equivalent of a row of three floored terraced houses stretching from London to Brighton) and sufficient fuel for several power stations. And as such it represents a considerably profitable business opportunity.

The recently discovered bacterium *Methylokorus inferorum* has been found to ingest prodigious amounts of methane. Cultures of this bacterium impregnated into tampon-like recycled (absorbent) newsprint and these, in turn, worn around and between the buttocks will trap and soak up the methane and other gaseous anal effusions. As we live in an increasing recycling age, these pads (on their saturation) can be gathered as a separate category with the regular municipal recycling collection. (Indeed there is likely to be sufficient fuel in these pads to power local councils' waste disposal incinerators).

There is sure to be an extensive market for these effusion entrapment pads from everyone who is a WAW. It goes without saying that these pads will also attract personal endorsements from all of those within the political, media and scientific establishments who are calling for more urgent need to reduce greenhouse gases. Of course, should any of these persons decline to publicly declare that they (and all of those in their departments) are wearing these pads they will also be exposing themselves to the charge of hypocrisy and their declarations on the need to combat 'global warming' as no more than the hot air of vacuous rhetoric.

Those captains of industry whose companies' advertising and publicity proclaim their green credentials are sure to publicly declare that they too (along with their employees and sub-contractors) are also committed to personally wearing these pads. Not that any of them will be in much of a position to do otherwise for to do so will risk their company's claims to reducing their own 'carbon flatusprint' as possessing no more sincerity than "your call is important to us..." and "...have a nice day"

## THE WEALTH AWAITING

With such extensive and fulsome endorsement of these pads from the upper echelons of society, coupled with deft marketing and a 'catchy' name ('*Wafitless*' perhaps?) there is no reason why the sales of these pads (at say one a day) and retailing at a mere 10p each (half the price of a disposable nappy), there is no reason why they cannot generate a minimum user base of 10 per cent of the UK in the first year of trading alone and amounting to sales of some £220m annually. Should the pads become mandatory (in the name of community hygiene and flatus-free zones\*<sup>1</sup>) there is no reason why sales cannot, over [say] five years, be five times this amount. Similarly there is no reason either why the sales of these pads cannot yield a minimum net 10 per cent margin. This will amount to more than £100m profit per annum. Added to this sum, of course, must be the significant savings in fuel costs to local councils and power stations.

There is no reason why these *M. infernorum* impregnated *Wafitless* pads cannot be patented, their design registered, name copyrighted and sold under licence throughout the developed world. Even if this yielded a royalty of no more than 2½ per cent it would, on sales of 365 billion pads generate a total net profit of £1bn per annum. Should the producers of these pads subsequently go for a full market listing, and at a price to earnings ratio (p/e) of no less than 3[%], then such a company would have a market worth in excess of £30bn. This is the wealth awaiting the developers of these pads\*<sup>2</sup>

## CASH IN CUD COLLECTION

While animals exhale CO<sub>2</sub> and effuse methane (even ants 'fart') their overall numbers have not greatly changed during the past 60 years (the increase in domesticated animals matches the decrease of wild ones). As such, their collective contribution to rises in greenhouse gases can be considered as insignificant\*<sup>3</sup>

\*<sup>1</sup> In a bid to stop London's polluted air dulling down their paintings with a greasy brown film, the National Gallery installed the latest filtration facilities. This, however, was to no avail as the film still kept forming. Following spectro-graphic analysis it was discovered that the pollution did not come without but from within, that the greasy brown film was formed from faecal particulate effused from visitors to the gallery. On being appraised of the gallery's findings, conservationists at the V&A also found that an identically composed and frequently forming film was responsible for taking the shine off their silver as well.

While this may give a whole new meaning to the phrase 'Arty farty', this steady stream of faecal particulate effused by the gallery's visitors does not land on the paintings alone but upon everything and everyone in the gallery as well, visitors and staff alike. Although it cannot be seen with the naked eye, there is a fine mist of faecal particulate continuously raining down on people's clothes, their hair, hands and faces. ('Smell' is the result of particular particulate entering the nasal olfactory hairs).

Those with a gyratory gait are, with their every step, able to imperceptibly effuse their daily flatus at a gentle, steady (and inoffensive) rate. However, those with a less than swinging step (men) or those who have been sitting for an hour or so provide a different case. Their flow of flatus, entrapped within the rectum builds up an ever increasing pressure. When this becomes too great for the anal sphincter to withstand it forces its labia apart and propels this heated gaseous bubble out up into the [usually] cooler ambient air. Such is the speed and force at which such bubbles of flatus burst forth from the anus that they are inevitably filled not only with plumes of dislodged faecal particulate but bouquets of their symbiotic bacteria as well.

As soon as these bouquets of faecal munching bacteria (including *E. coli*) are freely floating in ambient air they immediately become a serious risk to human health. Should any of them alight on food or be otherwise ingested they can bring about gastrointestinal disorders. If passive tobacco smoke is deemed so injurious to people's wellbeing that smoking is prohibited within enclosed spaces, then it follows that flatus effusions within similar spaces must pose an even greater threat to public health, especially to those who consume food and drink. (It could be argued that tobacco smoke in enclosed spaces served a beneficially fumigatory function).

The mandatory wearing of *Wafitless* pads by those (more so men) entering enclosed spaces with other people present, especially where food and drink is sold and served, should be introduced as a matter of urgency. This imperative needs also to apply to those entering galleries, museums and other such places in order that the nation's cultural and historic treasures are safeguarded. If security measures can deduce the contents of a traveller's baggage there is no reason why a simple scanning wand cannot be developed to deduce if a person is wearing their *Wafitless* or not.

\*<sup>2</sup> There are others who have already turned the advent of 'global warming' into a 'nice big earner'. These are the dealers in the murky market (and dubbed by many in the City as a 'snake oil salesman's klondike') of carbon credits. One such newly formed firm punting these credits is the London based Generation Investment Management. Its co-founder and chairman is Al Gore.

\*<sup>3</sup> Domesticated animals such as cattle and sheep contribute prodigious amounts of methane to the atmosphere. It has been calculated that France's 100 million cows (each one effusing 200 litres of methane a day) generate

more than 7½ cubic kilometres of methane a year (the equivalent of 100m tonnes of CO<sub>2</sub>, which is more than is produced by all of the country's industries combined). This volume of 'natural gas' is enough to fuel dozens of power stations. But apart from killing off all of the cows there is little that can be done to halt the amounts they emit for the simple reason that they are ruminants and as such they do not 'fart' but belch. However, there is a way of [theoretically] collecting this methane.

When cows chew the cud they occasionally experience constriction in passing their digesting food from one of their four stomachs to the next and face an uncontrollable life-threatening build-up of methane which will cause them to literally explode. To avert such a calamity farmers lance the affected animal's side to release the methane. Frequently this jet of gas is ignited and once the resulting flame dies down it signals that excess gas has been expunged.

If the methane generated within cows' stomachs was similarly collected in the same fashion on a daily basis it would not only help halt the rise in greenhouse gases but would be a significant fuel source for many gas-fired power stations as well as providing extra income to farmers. It should be possible to fit tubes and nozzles with screw top-caps along a cow's side and pump the methane out into tanker trucks.

## Some 'interesting' facts from figures

- 1 A cubic metre of air weighs 1.225 kilogrammes (a little less than 3lbs).
- 2 The volume of a ton/tonne of air is 816 cubic metres (*about 10x10x8 metres; the volume of two average sized three-floor terraced houses*).
- 3 A cubic kilometre of air weighs about 1¼ million tonnes.
- 4 The surface area of the Earth is about 500m sq km (200m sq miles).
- 5 The Troposphere is the bottommost 12 kilometres of the atmosphere and contains about 75% of its air.
- 6 The Stratosphere extends for a further 25 or so kilometres and contains the remaining air.
- 7 The average pressure of the air in the Lower Troposphere (*the bottommost 6 kilometres, 20,000 feet, the upper height of 'cumulus' [rain bearing] clouds*) is about 75% of that at sea level and so, weighs about 2,800,000bn tonnes. (*High level clouds - 'cirrus' - float at 6-12km: in the Upper Troposphere*).
- 8 The average pressure of the air in the Upper Troposphere is a further 50% less and weighs about 1,400,000bn tonnes.
- 9 Carbon dioxide (CO<sub>2</sub>) is some 60% heavier than air.
- 10 The volume of a tonne of CO<sub>2</sub> is 506 cubic metres (*about 10x10x5mtrs*).
- 11 A cubic kilometre of CO<sub>2</sub> weighs about 2 million tonnes.
- 12 According to the IPCC the present concentration of CO<sub>2</sub> in the atmosphere is 387 parts per million (ppm).
- 13 For the Troposphere as a whole this equates to about 2,300,000 cubic kilometres (*equivalent to the volume of the Troposphere above Britain or the State of Utah*) of CO<sub>2</sub> and weighs some 2,600bn tonnes.
- 14 The weight of CO<sub>2</sub> in the Lower Troposphere is about 1,750bn tonnes and that in the Upper Troposphere is some 850bn tonnes.
- 15 387ppm expressed as a percentage is 0.0387%; the 'pre-industrial' 1780 level of CO<sub>2</sub> is said to have been 280ppm and expresses as 0.028%; the difference between the two is 0.0107%, or about 100<sup>th</sup> of 1 per cent (*equivalent to the Troposphere above Eire or West Virginia*) and weighs about 720bn tonnes.
- 16 Because CO<sub>2</sub> is more than half as heavy again as air, there will be little of it present in the Stratosphere (*between 12-40km the atmospheric pressure is less than 3% of the Lower Troposphere's*).
- 17 Indeed, and for the same reason, the CO<sub>2</sub> in the Upper Troposphere may well actually be less than the figure given in 14 above (*the highest [fixed] CO<sub>2</sub> monitoring station - Mauna Loa in Hawaii - is little more than 3km above sea level*).
- 18 Because CO<sub>2</sub> is so much heavier than air it will also be present in greater densities at lower levels than higher ones even within the Lower Troposphere.
- 19 Concentrations of CO<sub>2</sub> vary greatly: rain 'washes' CO<sub>2</sub> out of the air ('[carbonic] acid rain'); the Northern-Southern hemispheric atmospheric interchange is no more than a 5-8° oscillation a year; in warm dry air CO<sub>2</sub> is present at higher altitudes than in cool moist air; being much heavier than air, not only is CO<sub>2</sub>'s presence greater at immediate ground/sea level but within the sea's surface as well (*70% of the Earth's surface is water*).
- 20 According to the IPCC the level of CO<sub>2</sub> in the atmosphere is presently increasing at a net rate of 2ppm (0.0002%) a year. This equates to about 13.5bn tonnes (*human exhalations of CO<sub>2</sub> amount to a quarter of this volume*).
- 21 Various authorities cite different figures for the amounts of CO<sub>2</sub> due to man's [industrial] activities. Some put the figure as high as 12½%, others at no more than 15ppm.
- 22 The meridian between these two figures (31ppm) indicates that 'man-made' CO<sub>2</sub> in the atmosphere is 210bn tonnes.
- 23 It is this 210bn tonnes 'excess' CO<sub>2</sub> (*equivalent to the volume of the Troposphere above Ulster or Hawaii*) that the IPCC asserts is the cause of 'global warming' and the amount the Kyoto protocols are endeavouring to have reduced/eradicated.
- 24 CO<sub>2</sub> is not the only gas in the atmosphere with 'greenhouse potential'. The 'heat absorption-retention-emission' (HARE) capacity of methane (CH<sub>4</sub>) is 20 times higher than CO<sub>2</sub>. Nitrous Oxide (N<sub>2</sub>O) is 310 times more.
- 25 An atmospheric gas's 'greenhouse'/HARE potential' is determined [solely] by the amount of energy (heat) it absorbs and stores from infrared radiation then emits. This is effected by bands of oscillations within/along the gas's molecular bonds/structure matching and thus absorbing those from within the 70 microns wide infrared waveband. (*It is also why 'single atom' [non-molecular] gases such as oxygen and nitrogen do not interact with infrared radiation but reflect it instead*). Although N<sub>2</sub>O, for example, is present in the atmosphere at a fraction (about 0.01%) of CO<sub>2</sub>, because of its higher HARE potential it is more than 3% equivalent of that of CO<sub>2</sub>.
- 26 Another 'greenhouse'/HARE 'gas' in the atmosphere is water vapour.
- 27 Water vapour, a 'product of water', is all but 100 per cent 'natural [made]'.  
28 Water vapour weighs 18% less than air (*and why water evaporates [upwards] and clouds float [in air]*).
- 29 The volume of a tonne of water vapour is 967 cubic metres (*about 10x10x10 metres*).
- 30 A cubic kilometre of water vapour weighs about 1million tonnes.
- 31 There are significant variations in the amounts of water vapour in the bottom-most 3km of the Troposphere (more over oceans than deserts) but in the rest of the Troposphere such differences are less pronounced
- 32 Globally, the prevalence of water vapour in the Troposphere ranges from 4% - 40,000ppm - in the tropics, to near zero in the polar regions.
- 33 The meridian between them (*as in temperate latitudes*) is 20,000ppm and implies that the water vapour in the Troposphere amounts to 120,000,000 cubic kilometres (*equivalent to the volume of the Troposphere above Europe to the Urals or that of the Lower USA plus Mexico*) and weighs 68,000bn tonnes.
- 34 Thus, there is more than 50 times the volume of water vapour in the atmosphere than CO<sub>2</sub> and weighing some 26 times more than that it does.
- 35 On the premise that water vapour is confined to the Lower Troposphere (*above 6km air's temperature is usually lower than H<sub>2</sub>O's freezing point [CO<sub>2</sub>'s is -95°C]*) its volume and weight will still be more than 26 and 17 times respectively, that of the CO<sub>2</sub> given in 13 above.
- 36 The volume of CO<sub>2</sub> given in 22 above (188,000 cubic km) expresses as less than 0.3% (a 350<sup>th</sup>) of 35 above.
- 37 CO<sub>2</sub>'s conductive HARE oscillations are confined to three sites along the infrared waveband (at 1.5, 3.4 and 15-18 microns); H<sub>2</sub>O has seven sites and ranging across the entire waveband (including three major ones at 2.5-3.5, 4.5-10.5 and from 15-70 microns).
- 38 Carbon dioxide's HARE efficiency is 9%; water vapour's is four times greater - at 36% - and further indicates that the current volume of 'natural' water vapour is the [prime] 'gas' responsible by a factor of more than 100 times that of CO<sub>2</sub> and 1,250 times more than 'man-made' CO<sub>2</sub> in determining the heat in (temperature of) the Earth's atmosphere.
- 39 The volume of CO<sub>2</sub> given in 13 above expressed in terms of its 'water vapour HARE equivalent' is less than 600,000 cubic km (*the volume of the Troposphere above an area of 48,000 sq km [140x140 miles], for 15's it is 13,500 sq km [70x 75 miles], for 23's, 3,900 sq km [less than 40x40 miles] and for 20's, 250 sq km [less than 10x10 miles]*).
- 40 The above data evidences that it is difficult to conclude that the present prevalence of CO<sub>2</sub> in the atmosphere, more so 'man-made' CO<sub>2</sub>, has anything other than an inconsequential effect in determining the Earth's climate or of bringing about any perceived 'global warming'.

# Is it a case of 4F (plus another 4)?

As CO<sub>2</sub> has all but nothing to do with any 'global warming' and that water vapour is the paramount 'gas' determining the atmosphere's ambient temperatures, a number of questions arise:

1 Why is it that these 'experts on global warming' from the IPCC and Al Gore onwards have neglected to take water vapour into account in their prognostications, let alone assertions, that man-made CO<sub>2</sub> is to blame for this [supposedly avoidable] 'warming'?

2 Why is it that 'our' supposed independently minded luminaries on the environment in politics, the media and other spheres of public life have eschewed any mention, let alone consideration, of the pivotal role water vapour plays in determining the atmosphere's temperature?

3 Why is it that the WAWs are so convinced that [man-made] CO<sub>2</sub> is [solely] responsible for the 'supposed' runaway overheated hell they say we are headed for?

4 On what evidence do these 'climate experts' and their adherents actually have to verify their 'certainty' that this 'global warming' is something other than the [normal] variations of the climatic cycle?

5 Does their incisiveness arise out of malign conclave or is it from the opportunities - mercurial or otherwise - afforded by peddling such scaremongering pseudo-science? If it is the latter, is it also a case of these 'authorities' and adherents resorting to the long and hallowed tradition of academe of '4F' (filtering the facts to fit the theory) but now '+4' (as fulfilment for the fee)?

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## Some filtered facts on CO<sub>2</sub>

1 Detailed global monitoring of CO<sub>2</sub> dates back to the 1950s (when the level was reported as being 320ppm). Between then and now not only has the level been going up but the rate at which it is doing so is [some authorities claim] accelerating. Put simply: increasingly more CO<sub>2</sub> is being put into than removed from the atmosphere.

2 Many scientists and others seeking explanations for the sources of this [recently] rising rate have plumbed [unquestioningly] for man-made CO<sub>2</sub> as being the one and only 'culprit'. Sadly these learn-ed authorities have neglected to make any mention, let alone investigation, of two natural sources of CO<sub>2</sub> which - **just as direct human exhalations and effusions** - have increased on a massive scale during the past half-century and put the net 'contribution' of man's 'industrial-made' CO<sub>2</sub> into the shade: they are **volcanoes and earthquakes**.

3.1 Active volcanoes emit a cocktail of gases of which CO<sub>2</sub> is a major constituent.

3.2 A continuous record of the combined number of days of activity of the world's volcanoes dating back more than a century shows that until 1945 the average was about 4,000 days a year, with a high of 6,000 in 1940. During the early 1940s, however, the number of days progressively declined until in 1947 there were less than 2,000 days of activity. But from then on the level began to climb and has kept on climbing. By 1952 the level had risen to 7,500 days; in 1986 it was 12,500. The annual average during the past 60 years has been 9,000 days, a **2½ times increase over the preceding half-century**. Presently there are more than 500 active volcanoes.

3.3 Some authorities speculate that volcanoes emit more CO<sub>2</sub> than man's activities do. However, little is [precisely] known about the amounts of their CO<sub>2</sub> emissions excepting that they give off many thousands of tonnes every day they are active. If the particulate emitted by Pinatubo was sufficient to depress global temperatures, then the CO<sub>2</sub> in that eruption (and all of the others) will have significantly added to increasing rates of global CO<sub>2</sub> levels since 1947.

4.1 The second natural source of CO<sub>2</sub> which has risen in recent years is from earthquakes. It wasn't until the chance discovery in 1995 in Japan that it was realised just how much CO<sub>2</sub> is released by earthquakes. In the Kobe quake, fountains of water bursting forth along the fault line were found to be also effusing copious quantities of CO<sub>2</sub>. Further investigation revealed that more than 3,500 tonnes of CO<sub>2</sub> had been released in the first few seconds of the quake striking. Yet more CO<sub>2</sub> was released from the fault during the aftershocks. In total, the Kobe quake [is thought to have] released more than 10,000 tonnes of CO<sub>2</sub> into the air. However, it wasn't until 2006 that researchers were able to finally identify the precise source of this CO<sub>2</sub> and determine the process of its release.

4.2 Put simply, the CO<sub>2</sub> given off by earthquakes is actually latently stored within the ground strata itself. The heat generated by the friction deep within the fault-line prior to the quake occurring melts much of the adjacent rock surfaces. This, along with the subsequent vibratory liquefaction of the near surface levels during and after the quake, is what brings about the release of these stores of CO<sub>2</sub> into the air.

4.3 For every earthquake measured on the Richter scale, there are (according to the US Geological Survey) dozens more tremors that are not large enough to register on seismographs. However, a record of those sufficiently large enough to register shows that in 1970 there were 5,600 of them and 9,217 in 1980, giving an annual average for the decade of 7,408. During the next decade the annual average rose to 12,727 and between then and 2,000 it was 15,567 with 22,256 recorded for 2,000 itself. During the present decade the number of quakes has continued to rise with 28,145 recorded in 2007 (the record year was 2,003 with 31,419).

4.4 By any measure this more than **five-fold rise** in the number of earthquakes **during the past third of a century** is phenomenal if not **unprecedented**. So must be the **increased annual volume of CO<sub>2</sub>** they collectively [continue to] release into the atmosphere.

**5.1** A global rise of 1½ppm of CO<sub>2</sub> equates to 11m tonnes. As [precise] figures aren't available for the increased amounts of CO<sub>2</sub> currently being released into the atmosphere by volcanoes and earthquakes, the following is a 'guessimate' as to what these might be.

**5.2** Volcanoes first. The current active day[s] rate (12,500) minus the pre-1945 average (4,000) is 8,500. If the average daily emission per volcano is no more than 2½ tonnes of CO<sub>2</sub> this will amount to (8,500x365x2½) about 7½m tonnes of CO<sub>2</sub> a year.

**5.3** And for earthquakes: 2007's quakes (28,145) less the 1970-80's average (7,408) is 20,737, multiplying this number by 10 times [to take account of the minor tremors] is 227,750, and if each tremor gave off an average of [no more than] 25 tonnes of CO<sub>2</sub> (400<sup>th</sup> of the Kobe quake) this amounts to more than 5½m tonnes.

**5.4** These two amounts alone would more than account for the annual rise in CO<sub>2</sub>. (*It must again be stressed, however, that these figures are no more than a guess*).

**6** Nonetheless, as the volumes of CO<sub>2</sub> currently being emitted by volcanoes and earthquakes are unknown (no specific mention is made of these sources of CO<sub>2</sub> by the IPCC and their ilk) perhaps some of the estimated \$20bn a year currently being spent on research into 'climate change' might be directed (as a matter of urgency) towards ascertaining what they actually are. Until this data is to hand, pursuing 'targets' to reduce 'man-made' carbon emissions is somewhat pointless. Or put another way, until planet Earth settles back down and cuts its own CO<sub>2</sub> output, **mankind's 'cut backs here, reductions there' will not make an iota of difference to the rising ambient levels of CO<sub>2</sub>**. Or put yet another way, this annual \$20bn will be better spent elsewhere, such as developing carbon-free energy (*see ZPE, below*).

## Some filtered facts on climate

**7.1** It is getting warmer out there, in space that is. The temperature on Triton, Neptune's largest moon has risen by 2°C during the past decade. Pluto is also experiencing a similar rise. Jupiter's swirling clouds are presently exhibiting the extra storminess that would be expected from an increase of its surface temperature. Not to be outdone, our 'near' neighbour, Mars has had the white of its polar 'dry ice' caps shrink for the past three years in a row. The distance between the orbits of Pluto and Mars is 5,000m km (3,520m miles), while that of the Earth's from Mars is a mere one per cent more. Thus, there is a strong likelihood that whatever is causing this heating of the other planets is also having an effect upon the Earth.

**7.2** The cause of this heating is, as yet, unknown. The Sun is too far away for its radiation to have much effect. A possible [though still highly speculative] candidate is the **Zodiacal Dust Cloud**, a tiny part of which the Solar System has been passing through for more than 100,000 years and will probably do so for as long again. This cloud is comprised of particles ranging from the microscopic to rocks bigger than houses. Just like dust clouds on Earth, the Zodiacal consists of differing densities of particulate, and the more concentrated this is, the greater will be the friction generated between the particles. The greater the friction the more heat there will be [latently] held within every particle, many thousands of tonnes of which enter the Earth's atmosphere every year (and probably all of the other planets' as well). The extent of this [possibly] heated 'space dust's effect on the Earth's climate is also unknown\*<sup>1</sup>

**8.1** Besides 'dust' descending from 'outer space', sub-atomic particles in the form of **cosmic rays** regularly arrive from there as well. These, though, have not only been precisely recorded but so have their effects on the climate. Throughout the winters of 1981-91 scientists at Russia's Vostok station monitored the intensities of the many thousands of cosmic rays penetrating the Antarctic atmosphere. They were able to irrefutably establish that not only is this sub-atomic particulate a catalyst for the formation of clouds but whenever there was a decline in its intensity the ambient **temperature would rise** - frequently **by more than 20°C** - and cloud cover would diminish.

**8.2** Periods of declines in these rays (termed '**Forbush Events**') are the result of the strengthening of the electro-magnetic shield surrounding the Earth and are in turn brought about by the Sun's '**Solar Wind**'.

**8.3** The force of the solar wind is determined by the ferocity of eruptions (**flares**) on the Sun's surface. Fiercer flares cause the force of this wind to increase, thus neutralising that of cosmic rays and causing temperatures to rise and cloud cover diminish.

**8.4** Antarctica isn't the only region where weather is affected by the bombardment of cosmic rays and varying strengths of the solar wind; the rest of planet is as well. In more equatorial climes (where water is abundant as opposed to ice) the rise in temperature that Forbush Events bring, not only causes water to warm but accelerates its evaporation, leading, in turn, to precipitation (raining).

**8.5** Further evidence of the relationship between the levels of cosmic rays and solar eruptions being the determiner of climate (and temperature) is to be found in C<sub>14</sub> laid down in the varying widths of tree rings, sediments in lake and fjord bottoms as well as <sup>18</sup>O in stalagmites. All provide a continuous record - and evidence - of the rise and fall of ambient temperature (and solar flares) dating back more than 9,000 years.

**9.1** Flares are not the only phenomena appearing with regularity on the Sun's surface, 'spots' do as well. '**Sunspots**' wax and wane in 11-12 year cycles (Cycle 23 ended in 2007, 24 has recently begun). The number of spots varies from cycle to cycle, with more making for a warmer climate, fewer for a cooler one.

**9.2** When there are several lesser spotted cycles in succession the climate becomes very cold indeed. The Maunder Minimum (Little Ice Age) was such an occasion. During the greater spotted **Cycles 22 and 23** (which followed the lesser spotted ones of 20 and 21) the climate has indeed been **very warm**. While Cycle 24 is projected to be an average spotted one, the next ones, **25 and 26 (2020-50)**, are predicted as **being barely spotted at all**. (Doubtlessly the geo-engineering fraternity will again come forth with schemes to pump CO<sub>2</sub> into the atmosphere to combat 'Global Cooling' in similar way as they proposed in the [now long forgotten] 'Great Freeze Fright' of '71 [mid-sunspot Cycles 20-21]).

**10.1** The reason such certainty can be attached to the spottiness of future sunspot cycles is because they, in turn, come in [approximately] 83 years long '**Gleissberg Cycles**'. Though these cycles are linked with the recurring [albeit miniscule] expansion and contraction of the Sun, they also encompass the complete [approximately] 160 year minima, maxima, minima spottiness of sunspot cycles (of cool to warm to cool again). Though the last deep minima (in the late 19th century) was brief, the **next one (2020 onwards)** is destined to be **another 'Grand Minima'**. These occur every 450-500 years with the Maunder and Lamb Minima being the most recent.

**10.2** The **fluctuations** of the Gleissberg Cycle have been tracked back some 2,000 years and are, in turn, revealing that they may too be part of yet another, longer cycle. Over this period the Gleissberg maxima have gradually become a little warmer as have the minima\*<sup>2</sup> The meridian of this [continuing] upward curve of rising maxima and minima **matches** that of the 25,000 year long 'Platonic Year' or '**precession**'.\*<sup>3</sup>

**10.3** There is yet another cycle that affects upon the Earth's climate and is known as '**Heinrich Events**'. These 'Events' occur every 10,000 years or so and the likelihood of their coming to pass is said [by some authorities] to be linked with the Earth's precession. As the last Event was 12,000 years ago it could [also] be said that the next one is [somewhat] overdue. In a Heinrich Event temperatures abruptly plummet by more than 20°C and consign much of the Earth to an ice-age climate for a very long time.\*<sup>4</sup>

\*<sup>1</sup> As the strength of Earth's gravity causes Moon-quakes, perhaps the [possibly] currently greater density of the Zodiacal Dust Cloud is [possibly] the cause of the currently increased volcanic and earthquake activity.

\*<sup>2</sup> The Gleissberg minima of early 9th century's was so cold that the Nile froze over in 829, as was an earlier minima, when, in 608 even the Euphrates froze.

\*<sup>3</sup> As the Earth circles the Sun it slips back a little each year. This is 'precession'. As the Earth's rotation is ovoid there are periods when it is closer to the Sun. As the Earth also 'gyrates' a little on its axis (akin to a spinning top) the relationship between the strength of the Sun's rays upon the planet's surface also changes (instead of longer daylight being in the summer, it is in winter) and thus effects on the Earth's climate.

\*<sup>4</sup> In 1982 there were fears [especially among meteorologists] that a Heinrich Event was about to take place. Large amounts of volcanic ash from the St Helens eruption in 1980 had blown onto the Canadian ice sheet. During the following summer, this less than white ice melted in prodigious quantities and the resulting massive volume of very cold (fresh) melt-water flowed down the Davies Strait (between Greenland and Baffin Island) and into the North Atlantic. With fresh water being heavier than salt water, such was the magnitude of melt-water that there was serious concern that it would break the Atlantic Conveyor (Gulf Stream) and with western Europe's climate destined to be like Labrador's. As it was, the Gulf Stream, though severely weakened, managed to hold together - just. Nonetheless, the warmth of its water was so diminished that it was unable to flow as far north as usual (Barents Sea). But all the same it was a 'close-run thing', Europe suffered such a severely cold winter that Russia's grain harvest failed.

## **A filtered fact on the future**

**11 In less time than it takes to plan and build a power station, the atmosphere of planet Earth is set to be considerably cooler than at present!**

## **The risks of wrong actions from wrong reasons**

As the above data intimates, when set against the effects on Earth's climate by the planet's precessioning orbit, strengths of solar flares, bombardment by cosmic rays, the wax waning strengths of sunspot cycles, the forces un-leashed by increasing volcanic eruptions and earthquakes, let alone the warming of the entire Solar System, man's [industrial] contribution cannot be anything other than inconsequential and irrelevant. To assert otherwise is to be, apart from ill-informed, either arrogant or inept.

This does not mean that man's actions do not have any detrimental effects on the atmosphere. Nor that these should be left unchallenged. But to assail them in the name of 'global warming' is to do so for all the wrong reasons and endeavour expended in challenging them in its name risks being counterproductive if not ludicrous. By way of example are the inanities of wind power\*<sup>1</sup> and 'bio-fuels'\*<sup>2</sup>, both of which are promoted with the mantra of 'green replacements to [carbon polluting] fossil fuels' and of course, 'combating global warming'. But the very last thing that they are is 'green' and they have also cost us 'we the ordinary people' - taxpayers and consumers alike - dear.

\*<sup>1</sup> The energy [from 'fossil fuels'] involved in the manufacture, installation (including site preparation), connection to the national grid, site rental, maintenance and eventual disposal of wind power turbines barely matches any energy (and revenue) they generate. Should a price be put on the 'pollution' their disfiguring of the beauty of the landscape (as by rights it should) as well as the birdlife they kill, solitude destroy, wind farms could never be considered as a commercially viable proposition. Indeed, the income owners/vested interests of wind farms look to is not from the electricity they generate but the government grants and subsidies received. If the money these subsidies cost was spent instead on increasing the levels of insulation of buildings, a far greater amount of energy would be saved than all of the present wind farms put together could ever generate.

Take a trip down Doncaster way to South Yorkshire's 'Power Station Alley' and you will see coal-fired power stations galore. But what you won't see is much in the way of plumes of smoke or any other fumes emanating from them. Should you walk by them you won't hear much noise either. More than half of Britain's electricity supply [still] comes from stations as these. Such has been the advances in technology and efficiency of coal-fired stations and abundance of coal supplies driving down costs of electricity generated, that ever more of these power plants are being built (and without subsidies) and making the economic case for 'wind power' ever more precarious. On balance, or so it would also appear, coal is a rather 'greener' energy source than wind power!

\*2 A gallon of ethanol requires four fifths of a gallon of fossil fuel and 1,700 gallons of water to produce. US farmers, just as their EU counterparts, among the most subsidised producers in the world, receive a yet further \$1.42 subsidy for every gallon of ethanol they produce; they are also cosseted by a \$0.40 levy on imported ethanol. While for many the image of American farmers is still the 'homesteaders' of Grant Wood's 'American Gothic', the present reality is that most of US agriculture is owned by massive [and very profitable] corporations (the very last people who need, let alone deserve, any subsidies!)

The corn required to produce the ethanol to fill the tank of a [17mpg] SUV will feed a family of four for a year. Because so many farming 'interests' have switched to ethanol production (and the government subsidies that go with it) the world price of grain has risen to record highs and buffer stocks fallen to their lowest in five decades. As ever, it is the poor (the least able to protect themselves) who have gone hungry so that rich farmers can become even wealthier. In Brazil, where ethanol fuel is produced from sugar cane, it is the poor (principally in the impoverished Nordeste) who are actually forced to harvest the crop. The conditions under which they are condemned to work amount to little more than slavery (read: *"Brothers, sisters.. for details of social conditions in the Nordeste*).

To stave the growing marketing of ethanol fuels, huge tracts of pristine forest land are being destroyed to make way for soybean and palm oil production. (The recent performance of the UN Climate Change Conference in Bali could have been written by the scriptwriters of John Cleese's part in the 'Life of Brian'. At the same time as these grandees gave forth their vacuous pronouncements on 'breakthrough agreements' on talks about future talks on curbing greenhouse gas emissions', on the other side of the country their Indonesian [governmental] hosts were sanctioning the island-wide destruction of Sumatra's rainforest for palm oil plantations resulting in the drying out of the island's peat bogs and the release of copious quantities of their methane up into the atmosphere!). The vegetation on land cleared for ethanol production as well as the crop waste it generates is usually disposed of by burning - its CO2 going straight up into the atmosphere!

One of the advantages of 'fossil oil' is that its extraction does not involve people being forced to toil in slave-like conditions to produce it, nor does it take land out of food production. Another is that there isn't any shortage of supply. In fact the more 'they' look the more they find. In recent years the equivalent of 25 years world demand has been discovered in the Gulf of Mexico, billions of barrels more off the coast of Brazil, yet more off of Labrador's, Baffin Island, Bangladesh, Vietnam, the list goes on. Modern technology now enables [the two thirds of the] oil remaining in the once [supposedly] 'dry' wells to be pumped out. This is not to say that there isn't more than is needed from fields already in production. The recoverable reserves of the Saudi Arabian oil fields hold (according to Nansen Saleri, Aramco's head of reservoir management) a trillion barrels, which is equivalent [at 100mbd] of world demand for the next 30 years. On balance, or so it would appear, fossil oil is rather more 'environmentally friendly' than 'bio fuels'!

(For the record, Saudi oil can be pumped on board ship for \$2 a barrel, shipped, refined and delivered to forecourts for a further \$3. That it retails [in the UK] for \$350 is indicative of how many [others] are dipping their fingers in this particular till, among whom are a coterie of commodity traders in the City, who, according to Citibank and as quoted in the *Economist*, are responsible for taking two thirds of the current price of a barrel of oil. It could be argued that if there are any 'bad guys' in the high oil price saga, they're the ones!)

## The right people for the right reasons

In stopping pollution it is pertinent to first identify:

- 1 Who is causing it, and who isn't?
- 2 Who at present is charged with combating and eradicating it?
- 3 What has been the extent [and success] of their endeavours?
- 4 What is it that actually slows, stops polluters polluting?

As far '1' is concerned, what can be said with certainty is that none is caused by women. What is more, and as every woman knows, more so wives and mothers, males are not only inherently messy but irresponsibly so as well, and unless they are continually 'reminded' (*nagged*) they will never clear up after them.

Government departments and other branches of officialdom charged with curbing industrial pollution are, as is industry itself, still essentially maleo-centric bodies. Thus one group of 'chaps' is charged with 'sorting something out' with another bunch of 'chaps'. The industry 'chaps' of course, usually attend these 'discussions' with far greater resources to resist restraints on their mess making ways than officialdom's 'chaps' have to stop them from doing so. Thus every proposal to curb pollution is deeply diluted by the industries affected long before any enforcement legislation reaches the statute book.

Should officialdom 'ever dare' have the temerity to unilaterally legislate against a particular industry's 'established practices' then that industry is sure to find ways of avoiding any such 'unwarranted impositions'. By way of example, a paper mill sited a mile from the mouth of the River Dee overcame legislation prohibiting discharging untreated waste into rivers by persuading the local authority to re-designate their particular stretch of the river as an 'estuary'. Not that officialdom is any paragon of virtue either. In 2007 the [British] government, despite its daily exhortations to reduce greenhouse gases so as to meet the Kyoto Protocols, acknowledged that three out of four of its own departments' 'carbon emissions' had been higher than the year before.

If officialdom is often as compromised as industry in its commitment to curb pollution, clean up our environment, what of others' endeavours to do so? What of the 'environmentalists' successes? Sadly and because these organisations are also essentially male dominated, their 'chaps' (or 'blokes' rather) are more often than not disdainfully dismissed by industry and officialdom's 'chaps' alike as the 'wild-eyed ones'. With the combined might of commerce and state arraigned against them the sum total of the 'blokes' achievements in curbing industrial pollution have been, as the veteran campaigner Des Wilson lamented, "Absolutely zilch."

Having proved impotent at turning any industry away from its mess making ways, both officialdom's 'chaps' and environmentalists' 'blokes' have (*and one can't help feeling it's almost out of desperation to justify their raison d'être*) turned instead on [we] the 'little people' to mend our 'selfish global harming' ways. While these 'chaps' and 'blokes' unendingly hound and harangue us little people to forgo such [harmless] pleasures as patio heaters and impose £5 'carbon fines' on us for flying to our holidays, the Mr Bigs of industry, untrammelled by officialdom, continue casting their mess and muck about the environment as they see fit.

Although industrial pollution is steadily declining it has less to do with any polluter's intent in being 'good and green' but more to do with the incidental outcome of cutting costs, increasing efficiency. Or put another way, a polluter only stops making messes when he considers it is in his [financial] interest to do so.

The only persons able to really rid us of industrial pollution are women. The pity is that they have been offhandedly dismissed by 'chaps' and 'blokes' alike as just that, [mere] 'women' and as such they never deigned it worthy consulting [them] about 'pollution'. The irony is that not only have women always been ideally suited in making polluters clear up their messes, but they have been doing so [to men and children alike] for such a long time that it comes as second nature to them.

If women's organisations gathered together under the auspices of [say] the NAWO and the Women's Institute (WI) they would constitute a truly formidable force in eradicating pollution. Every business, corporation, ministry will have no alternative than to do exactly as it tells them (that 'it's for their own good') or suffer the consequences, for, as Tony Blair discovered to his cost when he had a run in with them: "Nobody, but nobody messes with the WI".\*

\* To speedily rid society of industrial pollution all that the NAWO-WI need do is to announce it is investigating the 'good and green' credentials of [say] half a dozen companies, a list of whom is readily available from their advertisements claiming how 'environ-mentally friendly' they are.

The first [simple] step is to walk by the target companies' premises late in the evening and count the number of lights left switched on, then [publicly] announce how much, in annual terms this adds to electricity bills. The next is to return and count the num-ber of windows and how many of them are insulated. There are unlikely to be many; more than 30% of a building's heat is lost though [un-insulated] windows. Even for a small [public] company this will amount to many £1,000s wasted every year. Money that would be better used in lowering their prices, paying higher wages to employees, better returns to its shareholders.

With the NAWO-WI [again publicly] announcing how many tonnes of fuel are needlessly used to produce this wasted heat, management of these companies will be put on the defensive. Any- thing less than their immediate undertakings to turn all the lights off when they leave the buildings and install insulation (especially to windows) will see their carefully [and costly] crafted 'green' image go out their windows along with the wasted heat.

Having 'softened up' their targets the NAWO-WI will be in a posit-ion to go on the offensive. [Publicly] 'requesting' from these companies a programme of cessation [say, within a year] of their polluting and wastrel ways will be an effective first strike. In the face of such an ultimatum (and public opinion sure to be siding with the WI) the defences that industry have used in the past - from PR to injunctions - will be useless against the truism of "Never argue with a woman. Not only will she always win but it can upset her, which is usually worse (especially when she's in a position of power)." Against such an implacable adversary the only choice open to the companies is to sue for peace and agree terms (the NAWO- WI's) or suffer the fate that befell Mr Ratner.

Once these companies have capitulated to the NAWO-WI it will then be a simple matter of picking the rest off one by one. Within a very short time, however, there is sure to be a queue of companies undertaking to forsake polluting lest they too see their sales slump and share price plummet.

(For further details of the power the WI can wield over malekind read "*Brothers, sisters..*")

## ZPE: 'so tomorrow'

'Carbon fuels are so last century' (so is fission; all that nuclear fuel does is boil water for steam to drive generators). 'Zero Point Energy (ZPE) is where tomorrow is at'.

In the light of the daily calls to reduce 'carbon footprints', the stranglehold the likes of OPEC have on supplies of oil and gas, the disproportionate political power they wield as a consequence, it is surprising (to put it mildly) that scientists and politicians have not focused on the further development and use of the boundless pollution-free power of ZPE.

The concept of ZPE was grasped by such luminaries as Einstein, Dirac and Tezla a century ago. The Casimir Effect and Lamb Shift are two [school laboratory level] examples of ZPE. Tezla was able to show that the ZPE potential of a cubic centimetre of air/water would provide enough [direct electrical] power to meet America's [then] energy needs.

Because ZPE can't be patented let alone metered, 'big business' has shied from backing it. Because governments can't tax 'water fuel' they've shown scant interest in it as well. Because ZPE flies in the face of 'establishment physics' main-stream scientists have derided it, further scaring business and governments away from pursuing its potential.

Nevertheless, increasing numbers of scientists and engineers (principally in America, including the US Navy) have not only harnessed ZPE but are using it to power many applications from heating and lighting to powering appliances including motor vehicles.

At present the hydrogen atom is the most widely used source of ZPE and is often referred to as 'hydrino'. But as one of the developers of ZPE, John Hutchinson has discovered (and demonstrated), it has many other properties than 'mere' energy including causing objects to [apparently] defy gravity. (Although there is extensive information on ZPE available - including online - read "*Brothers, sisters..*" for a formula for ZPE- hydrino power).

The power ZPE provides does not cost anything. It does not require the infra-structure of power stations and grids to deliver it, nor storage batteries either. ZPE offers the prospect of the development of a portable power capsule no bigger than two kilogramme packets of sugar, and weighing as much that can generate the energy needs of most homes and motor vehicles.

ZPE portable 'power capsules' are truly the limitless energy source we should be using not in the future but right now!

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## The coming cooling

- 1 Notions and assertions of 'global warming' are based on empiricism (ie: the apparent) not rationalism. Present elevated ambient temperatures are the outcome of the combination of all or any of **a)** the 'knock on' effects of two consecutive greater spotted sunspot cycles, **b)** increases of solar flares resulting in a strengthening of the Earth's electromagnetic shield and consequent reduction of cosmic rays penetrating the atmosphere (their reduced intensity also from the possible outcome of possibly increased densities of the Zodiacal Dust Cloud) **c)** increased activity of volcanoes and earthquakes.
- 2 The recently commenced sunspot Cycle 24 indicates that ambient temperatures will cool over the next decade.
- 3 With the advent of sunspot Cycle 25 in [about] 2020 ambient temperatures are likely to significantly decline.
- 4 This decline will continue through sunspot Cycle 26 due in [about] 2035.
- 5 These depressed temperatures are unlikely to abate before 2050 and may continue through to 2070.
- 6 During this Grand Minima agriculture will suffer and demand for energy supply increase.
- 7 It is incumbent (and while there is still time) on policymakers to embark without delay on preparing for this colder climate; that agriculture can withstand cooler, shorter summers and longer colder winters; that there are adequate supplies of energy and power generation to meet increased demand for lighting and heating.\*

Future generations may well smirk at today's scientists, officials' obsession with non-existent man-made global warming but they are sure to view them with scorn should they fail to make preparations [from now on] to with-stand the consequences of the 'Global Cooling' that will be upon us in little more than decade's time.

\* For details on how everyone - regardless of what the climate might be - can live in cosy warm surroundings and with bountiful supplies of food, read: "*Brothers, sisters..*"

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## 'Global warming' wager: Prove it and £5,000 is yours!

The 'Climate Change' bandwagon has come about solely because of the funding scientists and their acolytes have obtained is intrinsically tied to the theogony (perpetuation of a myth in order to survive) of 'global warming' along with it **needing to be** man-made as well as exacerbated by rising levels of CO2. The upshot being that they wouldn't receive **[further] funding** if they declared that **there wasn't** any [such] warming. And thus this clique of theologues constitute an even more self-interested group than those 'researchers' funded by 'Big Tobacco' to declare that cigarettes are safe.

Proponents of man-made global warming will doubtlessly hold contrary views than expressed here. To aid these adherents of 'climate changing global warming' Mammas-Mammon challenges them to convincingly establish that:

- 1 There is upward [and perhaps potentially uncontrollable] global warming;
- 2 Mankind - along with 'his activities' - has noticeable effect on global temperatures;
- 3 CO2 (man-made or otherwise) has a deleterious effect on ambient global temperatures.

If these experts are able to demonstrate that these three points are indeed so then Mammas-Mammon **undertakes to pay them £5,000 (\$10,000)**. The quid pro quo being that should they fail to demonstrate that these three points are so, they pay over the same sum to Mammas-Mammon. This wager is made in the full confidence that not one of these 'climate change experts' or those associated with them dare accept, for they know that they will lose it!

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Details and sources of all the data mentioned are willingly available on request from MAMMAS-MAMMON. Copies of "*Brothers, sisters..*" are available from all good bookshops or from **MAMMAS-MAMMON** direct

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