Prime Meridian

(9) January 16, 2013

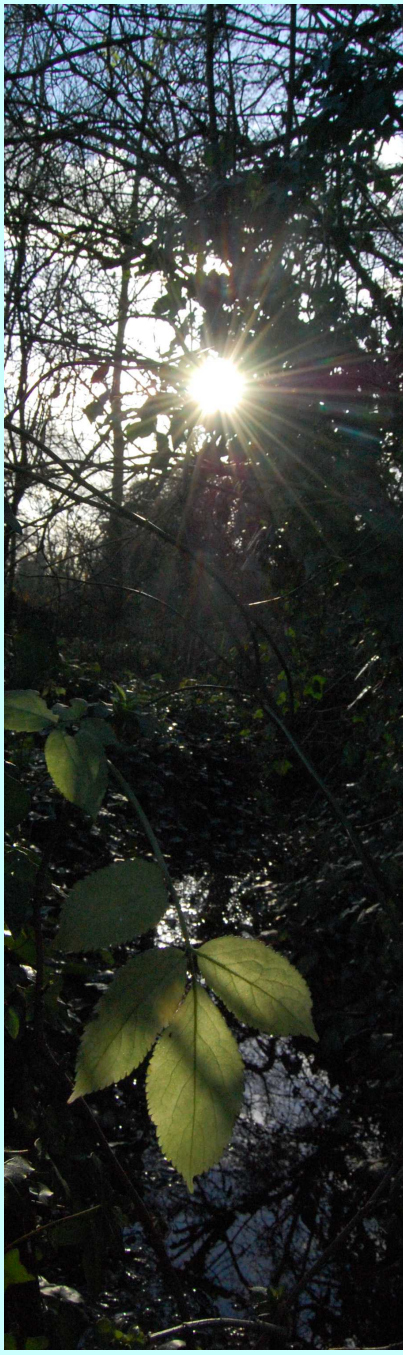
Above: The Houses of Parliament, London, from Waterloo Bridge (Dec. 11, 2012).

We enter 2013 facing an historic challenge.

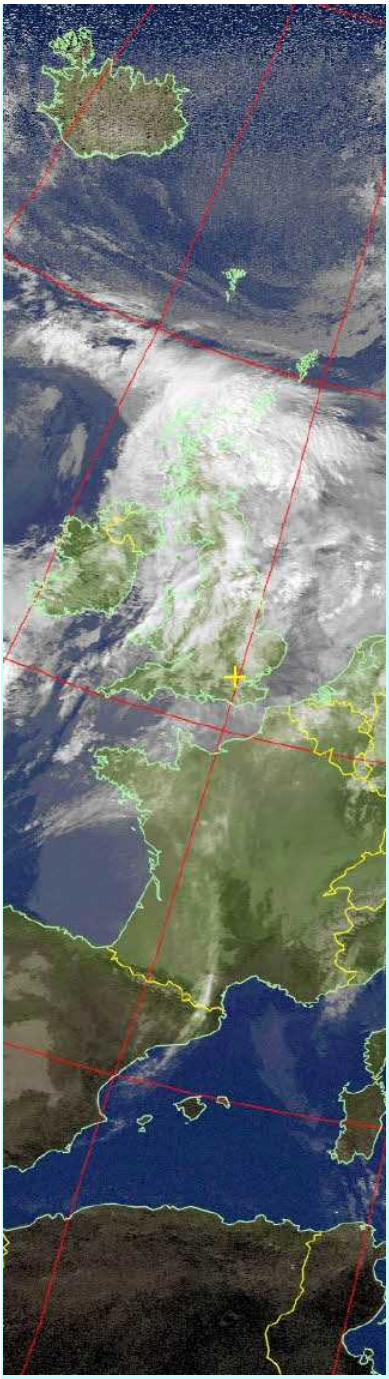
Martin Heath (Editor): The start of a new year is a time to celebrate the possibilities of the future, but it is also a time for taking realistic stock of the state of the world and of the scale of the challenges ahead. Since Rachel Carson published "*Silent Spring*" in 1962, campaigners have had considerable success in transforming public awareness of ecology issues, and in stimulating governmental action on many levels. Unfortunately, there remain huge gulfs between what has been achieved and what needs to be achieved.

This newsletter is very much about one particular dilemma: our civilisation successfully supports billions of people in the short-term, but through means that threaten, in the longer-term, to undermine the global environment. The world urgently needs practical answers, yet, the search for answers is often not prioritised, and so far, no non-problematic solutions have been proposed, be they in terms of renewable energy, nuclear power, or geoengineering. A fast and drastic re-structuring of society as demanded by some protesters is neither likely to materialise nor would it be possible in any case without huge social upheavals and human cost.

As the time for finding answers runs out, one must note with concern that few politicians have any training in climate or ecology (or any science), whilst a sizeable proportion are schooled in advocacy, presentation and debating. Much of their effort is focussed on the immediate short-term goal of persuading electorates that their party is the best choice for ensuring the quality of life to which the developed world's post-WWII generations have become accustomed, rather than on the tougher problem of securing its future in the face of longer-term threats. We ask readers to join us in looking beyond our comfort zone and in taking responsibility for a future in which environmental change may put the resilience of our cherished peace, democracy, social stability (and comforts) to the test. We must ask how we, as campaigners, can develop credible initiatives that can engage all sectors of society in Earth stewardship.



Right: Signs of new life are already apparent in the New Year's Day sunshine. Ecology site, Belair Park, South London.



Activities essential to our civilisation, notably power generation, transport, industry, agriculture and residential, involve major CO_2 emissions, so the world's inability to get a meaningful grip on emissions, despite growing fears of dangerous climate change, should not be surprising. This illustrates the true scale of the dilemma which we face.

Record CO_2 output. A (late 2012) report from the Netherlands Environmental Assessment Agency (Olivier *et al.*, 2012) has confirmed that human emissions of CO_2 were higher in 2011 than at any other time in history. CO_2 emissions fell in 2008, but there was a massive 5% upsurge in 2010. A further 3% increase in 2011 meant a record CO_2 output of 34 billion tonnes. Since the historic 1992 UN Earth Summit in Rio de Janeiro, emissions, rather than being curbed, have risen by 50% and the amount of CO_2 in the atmosphere from 356 to 392 ppm. It has been argued (Meinhausen *et al.*, 2009) that if we are to keep global warming under the 2°C threshold predicted for dangerous climate change, then CO_2 emissions between 2000 to 2050 should not exceed 1,000 to 1,500 billion tonnes. However, the estimated total CO_2 output since 2000 has already been 420 ± 50 billion tonnes – over a third of this total. The top six CO_2 emitting states/regions presently produce 71% of the world's emissions. They are China 29%, USA 16%, EU 11%, India 6%, Russian Federation 5% and Japan 4%.

Disappointment after Doha. Scientists and campaigners have warned that far too little emerged from the latest climate conference (Doha, Qatar, Nov. 26 to Dec. 7); urgent action is needed. The gruelling work that must have gone into staging COP 18 (Conference of the Parties 18), attended by representatives from 194 nations should not be belittled. However, the optimistic tone of the COP18 website: "*Conference 'a moment of celebration' Organisers of COP18/CMP8 praise outcome and pay tribute to team behind the event*" contrasts sharply with criticism of its outcome from the scientific press and from campaigners. 37 nations (responsible for 15% of global CO_2 output) agreed to extend the 1997 Kyoto Protocol until 2020 (with a successor treaty to be developed by 2015). An editorial in *Nature* for Dec. 13, 2012 noted acrimonious discussions that continued late and concluded messily. It warned (*Nature* **492**: 153): "*The political inertia that characterizes the world's response to global warming cannot continue. Politicians and policy-makers must follow the climate's lead - and change*."

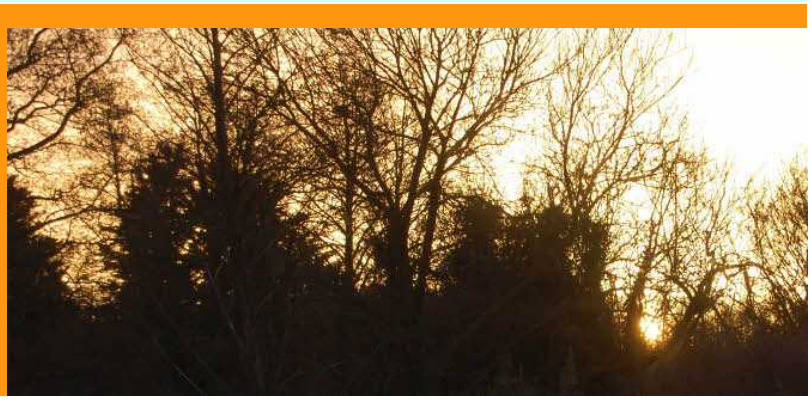
Nicholas Stern (Chair of the Grantham Research Institute on Climate Change and the Environment, at the London School of Economics) was quoted: "*There has been, yet again, a very big mismatch between the scale and urgency of action required to effectively manage the huge risks of climate change, and the political will and ambition that has been displayed*".

Above left: NOAA satellite image of Britain on Jan. 7, 2012 (Courtesy Geoff Hamilton).

Closest to the Sun.

This year, the Earth swung through perihelion (the closest part of its orbit to the Sun) early on the morning of January 2, when it was just 98.3% of its average distance from our star. Here we see the Sun on Jan. 2, rising above trees at New Ash Green, Kent.

Image: P. Stanford.



Let's cast our minds back to previous climate change pronouncements. The language was familiar and urgent to the point of becoming apocalyptic, but it has, clearly, not been matched by meaningful progress.

In the Millennium Development Goals Report 2009 (United Nations, 2009), *Secretary-General of the United Nations,* Ban Ki-moon emphasised of the MDG, (p. 3): "*Nothing less than the viability of our planet and the future of humanity are at stake.*" In December 2009, the United Nations Climate Change Conference was staged in Copenhagen. Reviewing the conference for the journal *Nature*, Tollerson (2009) quoted the opinions of Martin Parry, the former IPCC working group co-chair (p. 967): "*temperatures are likely to rise by at least 3ºC.*" Another estimate was 3.9ºC by 2100. This situation had not changed in 2011, when Durban hosted the 17th session of the Conference of the Parties to the United Nations Framework Convention on Climate (COP 17). An editorial in *Nature* (Dec. 15, 2011; **480**: 292) lamented that saving the planet or stopping global warming was never the goal of policies to reduce greenhouse gas emissions; their intention was damage limitation. The 3 to 4ºC rise in global temperature predicted by some analyses of the Durban outcome was "*clearly much worse than the 2˚C used as shorthand for dangerous at present. But it is preferable to the 5˚C or 6˚C that science suggests is possible if emissions continue to rise unabated.*"In his address at Durban, Ban Ki-moon (Remarks to UNFCCC COP17 High Level Segment) told participants (p. 2): "*The World Meteorological Organisation has reported that carbon emissions are at their highest in history and rising . . . According to the International Energy Agency, we are nearing the "point of no return," and we must pull back from the abyss.*" Conference President Maite Nkoana-Mashabane expressed "*grave concern*" about the "*significant gap*" between what was being done and what was needed to have "*a likely chance of holding the increase in global average temperatures below 2°C or 1.5ºC above pre-industrial levels.*"

An alternative view of the way ahead (Diringer, 2011) was put forward in the run-up to Durban. It holds that Kyoto was (p. 291): "*an important emblem of multilateralism*", but that a binding-commitment-or-nothing mentality might be doing more harm than good. It was argued that incremental change, with voluntary arrangements evolving between nations would work much better than attempts to impose top down binding agreements: "*Modest successes were achieved at last year's climate-change negotiations in Cancún, Mexico. The parties should build on that with further steps to strengthen the regime; they should also declare their intent to work towards binding commitments, while acknowledging that this will take time*." Is this a way to jump out of the groove in which we appear to have become stuck?

References.

Diringer, E. (2011). Letting go of Kyoto. *Nature* **479**: 291-292.
Meinhausen, M. *et al*. (2009). *Nature* **458**: 1,158-1,162.
Nkoana-Mashabane, M. (2012). A Proposal by the conference President. Draft decision – COP 17 - Advance Unedited Version - Establishment of an *Ad Hoc* Working group on the Durban Platform for Enhanced Action.
Olivier, J. G. J. *et al*. (2012). *Trends in Global CO_2 Emissions 2012 Report*. PBL Netherlands Environmental Assessment Agency. The Hague/Bilthoven. PBL publication number: 500114022.
Tollefson, J, (2009). World looks ahead post-Copenhagen. *Nature* **462**: 966-967.
Tollefson, J. (2011). Durban maps path to climate treaty. *Nature* **480**: 299-300.
United Nations (2009). *Millennium Development Goals Report 2009*. New York, NY, U.S.A.: United Nations Department of Economic and Social Affairs.

A bare winter hedgerow, in the vicinity of Ash, Kent. Jan. 3, 2013.

Below: The final day of 2012 drew to a gloomy close (photo taken near West Kingsdown, Kent).

Lobbying for effective action must intensify.

It is difficult to avoid the impression that the politicians and planners are out of their depth with climate change, and that they have no meaningful road map to take us into a secure future. The painfully indecisive proceedings at climate conferences lend themselves to the kind of criticism being levelled by Rajan Alexander, a blogger who attends these events and covers them from the hostile perspective of one who dismisses human-made climate change. Alexander reported acerbically from COP 18: "*The Indians have gone home. The Chinese are being told off. Nobody else is very interested, except developing nations looking for a handout. The Australians already agreed to everything whatever it is*" . . . "*There is no reason to keep funding a conference that's proven to be such a failure at making scientific advances or at representing the people who pay for it.*" . . . "*if you think the whole CO_2 issue is nothing but a huge scam, then you can breath out yet another sigh of relief. Saved again from another dumb treaty. Better yet, it is becoming increasingly clear that most of the planet no longer takes the issue seriously - a mindset that will only increase as time goes by.*" This, surely, is not the impression that participating governments wish to create.

Nuclear power update.

Nuclear power offers a means of generating large-scale reliable power without the threat of climate change. Unfortunately, fission reactors create radioactive by-products, whilst fusion remains, after decades of great interest, very much in its infancy. Around the world, some 26 new nuclear fission power plants are planned, to the dismay of many environmentalists who fear both nuclear accidents and the formidable long-term problems posed by nuclear waste disposal. In addition, an economic blow for nuclear power is looming. During this year, the Highly Enriched Uranium agreement comes to an end. Under the HEU terms, the USA has, since 1991, been processing uranium supplied by Russia from old Soviet nuclear warheads into fuel. This has provided for around 10% of the USA's electricity and 20% of the global nuclear fuel supply. The opening of new mines to meet the demand will be good news for investors, but it will also see a price hike.

There is a cogent case for encouraging fusion research, but funding must be targeted carefully. Controversy surrounds an unsuccessful project at the USA's National Ignition Facility (Lawrence Livermore National Laboratory) to initiate fusion (using 192 laser beams to compress hydrogen in a small capsule). An editorial in *Nature* for Nov. 8, 2012 (*Nature* **491**: 159) warned that: "*The line between optimism and overselling is a thin one that can too easily be crossed*" and regretted how: "*Enthusiasm gave way to saving face, as the leadership struggled to hold the line and keep up the appearance that all was going well.*" Critics now fear that a re-vamped project is a pathway to continued funding, not to ignition (G. Brumfiel, doi:10.1038/nature.2012.12016). Meanwhile, the most efficient progress towards usable fusion energy is being made in Europe, under the umbrella of the European Fusion Development Agreement. Ignition has been achieved at the Joint European Torus, based in Oxfordshire, UK. Planned next is a reactor known as ITER (from the Latin for "the way") and its successor DEMO is hoped to supply electricity to the grid. The EFDA website claims that: "*With substantial funding, the DEMO power plant could be running in 2030 and a fusion commercial power plant could be ready by 2050.*" Even if progress unfolds on schedule, however, the time-scale is disturbing when measured against the urgency of restricting greenhouse gas emissions.

Seasons in South East England

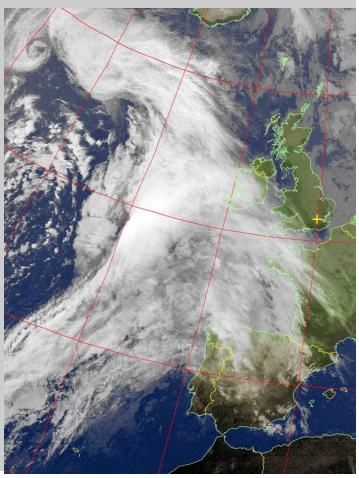
December, 2012

Above: Sun nears horizon on Dec. 8, 2012 near West Kingsdown, Kent).

Colder than average at first, warmer in the second half, the mean December temperature for the UK was 3.8ºC (the 1981-2010 average). This was the wettest December since 1999 and the eighth wettest since 1910, with the UK's overall rainfall 150% of the mean. Sunshine was 120% of the 1981-2010 mean. The month began with unsettled, cool weather, with rain and some sleet and snow over England's higher ground. On Dec. 6, the UK's minimum temperature (-12.9ºC) was recorded at Braemar (Aberdeenshire). Anticyclonic conditions by Dec. 10 saw sunny conditions with frost at night and fog lingered into the next day. Dec. 12 saw some flights from London cancelled. Heavy frontal rain occurred throughout the UK from Dec. 14 to 15 (with gales in places on the S coast on Dec. 14). From Dec. 16, W and SW winds associated with a low-pressure area in the North Atlantic brought "*very mild but exceptionally wet conditions*" between Dec. 16 and Dec. 22 saw the UK's maximum temperature of 15.0ºC at Westonzoyland (Somerset). From then until the close of the month, there were outbreaks of showers and rains. Dec. 27 saw the Thames flood barrier closed to protect properties on the Thames flood plain. Rain had generally cleared by New Year's Eve.

For SE and central S England, mean max. temp.8.7ºC (+0.6ºC); mean min. temp.: 2.1ºC (-0.3ºC). Hours of sunshine: 60.6 (125%). Rain: 142.1 mm (165%). Anomalies re. 1971-2000 norm in brackets. Respective figs. re. 1981-2010 norm are 0.8ºC; 0.0ºC; 118%; 169%.

Right: Weather systems around Britain at 15:10 GMT on December 18, 2012. (NOAA 18 satellite). Image courtesy of Geoff Hamilton.



The Ecospheres Project is co-ordinated by M. J. Heath (UK) and Laurance R. Doyle (USA).

Above left from top: Christmas tree (annual donation from Norway) in Trafalgar Square, London, Dec. 7, 2012. South London: Carol service, Christmas Eve, All Saint's Church, West Dulwich; Fireworks marked start of New Year, Norwood Park. Frosted leaves, Dec. 2, 2012.