

THIS WEEK

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Words are not enough

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.

The past week saw a number of pronouncements on the subject of climate change. Not surprising given that, in Doha, the United Nations was wrapping up the latest round of its annual political negotiations on a global agreement to regulate greenhouse-gas emissions. But the words, and the bundle of small practical actions, that emerged from the meeting had a familiar ring.

"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," said Nicholas Stern, chair of the Grantham Research Institute on Climate Change and the Environment at the London School of Economics.

"This package offers improved continuity from existing carbon markets to the new markets of the future. But it still won't inspire action at the scale commensurate with the Copenhagen objective of limiting warming to 2°C," said Dirk Forrister, president of the International Emissions Trading Association.

Both statements tell you that the Doha talks followed the recent trend: warm political words but little sign of serious action. There was some minor progress on secondary issues, just enough to keep the show on the road, but little to address the core problem of soaring emissions.

There were some familiar problems as well. Here's Oleg Shamanov, Russian negotiator at Doha, grumbling at the way his objection to the final Doha text was overruled: "It has to be clearly stated that this is an outrageous violation and absolutely unacceptable conduct of business. The way those decisions were adopted extremely seriously undermines the legitimacy of the regime." And Christiana Figueres, executive secretary of the UN's Framework Convention on Climate Change: "What we understand is that what Russia wants and needs is actually in those texts so my recommendation to our good Russian colleague is to take the time to read these texts."

Once again, the climate talks dragged on into the small hours, way past their scheduled finish time, and descended into acrimony — even with so little of substance on the negotiating table. A late and messy end is becoming as much a pre-Christmas tradition as the trees erected in the airports that the delegates pass through on their way home. "In the 16 years we have been coming to these conferences, there has been no global warming at all." That statement came from the British climate sceptic Christopher Monckton, who impersonated a delegate from Myanmar to address the conference floor, and did at least offer some light relief. "Can we have your conference pass back, please?" was pretty much the UN response. "Oh, and don't come back."

Bona fide attendees at Doha together produced a plan and timetable of sorts towards establishing a new agreement in 2015. In the meantime, a weakened Kyoto Protocol was extended to 2020, minus the signatures of Russia, Canada and Japan. Talks on how the rich world

will finance efforts to cut emissions and adapt to changed weather patterns in the poor world ran into the desert sand and will be taken up again at the end of 2013 in Warsaw.

Away from Doha, here is another statement on climate change: average global temperature will rise by 0.7–1.5°C between 1990 and 2030, with a best estimate of 1.1°C. That is derived from the very first report of the Intergovernmental Panel on Climate Change in 1990. In many ways it is the first consensus prediction of climate change. We're now more than half way through the period covered by that prediction and so far, at least, it is bang on.

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In a paper published this month, climate researchers David Frame and Dáithí Stone analyse that original prediction — and its success (D. J. Frame and D. A. Stone *Nature Clim. Change* <http://doi.org/jx6>; 2012). "It seems highly likely that even in 1990 we understood the climate system well enough to make credible statements about how its aggregate properties would change on timescales out to a couple of decades," they write.

And, from the same paper, here's a line on climate that deserves to roll around the world. "The scientific community has now been working on the climate change topic for a period comparable to the prediction and the timescales over which the climate is expected to respond." The global atmosphere, the planet itself, has shifted while the politics has stood still. What more is there to say? ■

Life on land

Evidence for the first land life is controversial, but the fossil record has a tendency to surprise.

When did life first appear on land? The answer to this question — one of the most fundamental in science — rather depends on the values you choose for 'life' and 'land'.

There is certainly evidence for freshwater life — pond life, essentially — a billion years ago or so (P. K. Strother *et al. Nature* **473**, 505–509; 2011). Apart from that, the evidence is indirect and inferred from signs of weathering of non-marine rocks and the presence of apparent palaeosols — sediments indicative of fossilized soil that, by definition, were exposed to the air. Actual fossils that might be signs of land life in the Precambrian eon (before 542 million years ago) are exceedingly rare — or, some say, mythical.

It is a highly controversial subject, and one scientist who didn't shy away from controversy was the late palaeobotanist Jane Gray. Starting in the 1950s, Gray argued, often vociferously, for the presence of

life on land at an early date. Being female, ferocious and an advocate of an unpopular view, she didn't get many grants. But as biologist William Shear wrote in her obituary, she "was as astute at playing the stock market as she was at interpreting fossil spores, and used her independent wealth to fund her own research" (see *Nature* 405, 34; 2000).

Gregory Retallack of the University of Oregon in Eugene, like Jane Gray, is unafraid to plough a contrarian furrow in this much-debated area. For many years now, he has worked on palaeosols from the Precambrian. The problem with fossil soils is that they are conventionally recognized by traces of the organisms that lived in them, especially plant roots. There lies a conundrum — how do you recognize a palaeosol in sediment that lacks plant roots? The answer comes through careful geological work, to show that the palaeosol is associated with rock formed under non-marine conditions, together with work on geochemistry and data from stable isotopes. But there might also be direct evidence in the fossil soil, in the form of carbonate nodules, sand crystals and cracks caused by desiccation or the presence of ice.

Evidence of this sort has now led Retallack to infer the presence of palaeosols among rocks from the Ediacaran period (635 million to 542 million years ago) of South Australia. One might think that soils from the latest Precambrian are hardly controversial, even by the standards of a highly charged field. But these rocks contain fairly abundant evidence for the first macroscopic life — which, until now, was widely assumed to have been marine.

Ediacaran rocks feature a wide range of large, distinctive and yet enigmatic structures, usually thought to be fossils of living creatures. Originally found in South Australia, Ediacaran fossils have since been discovered in localities as far-flung as Newfoundland in Canada, Arctic Russia and the English Midlands.

The Ediacarans, however, were a rum lot. Although clearly highly organized, their precise nature has been elusive. If they were animals, they bore little or no resemblance to any other creatures, either fossil or extant. This has led to suggestions that they were giant protists, fungi,

algae, lichens or even a kind of life entirely different from anything else known and now wholly extinct.

Perhaps the only point of agreement is that, whatever else they were, the Ediacarans lived on the sandy beds of shallow, sunlit seas. This is where Retallack parts company with just about everyone else, because some of his Ediacaran palaeosols are associated with Ediacaran fossils. This would mean that at least some Ediacarans lived on land,

“The stately progression of life from water to land was not necessarily a single, simple narrative.”

under the sky, perhaps in the manner of lichens, or microbial colonies that form soil crusts. The Ediacarans, then, would be the now-not-so-rare (and not at all mythical) creatures that first colonized the land — not just in puddles, but in soils indicative of a dry, cold desert. This is as far away as imaginable from the oceanic idyll that many have assumed for Ediacaran organisms, and have

reconstructed as such in a million coffee-table books.

These conclusions are published in a paper on *Nature's* website this week (G. J. Retallack *Nature* <http://dx.doi.org/10.1038/nature11777>; 2012) and will cause sharp intakes of breath in the palaeontological community; so much so that we have commissioned a News and Views Forum to air the arguments (S. Xiao & L. P. Knauth *Nature* <http://dx.doi.org/10.1038/nature11765>; 2012).

More work — and more science — will be the only way to validate this challenging and exciting work. But the lesson from the past is clear. Jane Gray's advocacy of land life in the relatively recent Ordovician period (485 million to 443 million years ago), once seen as off-the-wall, is now orthodoxy. There is nothing outré in principle in the supposition that life of some sort, however humble, lived on land from a very early date: the stately progression of life from water to land was not necessarily the single, simple narrative that seems so cut and dried in retrospect. The fossil record has this irritating habit: just when everyone thinks that the narrative has been sorted out, something comes along to force the story in a new, unexpected and breathtaking direction. ■

ANNOUNCEMENT

A new iPad app for *Nature* readers

Many publishers hope that tablet renditions of newspapers and magazines will revive the fortunes of once-mighty but now financially stressed publications founded in print. *Nature's* fortunes over the years have been relatively positive. Its print circulation has declined since its peak in 2002, but not as markedly as those of many other publications. Meanwhile, the online readership of *Nature* is more than 3 million unique users every month, and growing significantly year on year.

However, there is a world of difference in user experience between *Nature* on a desktop computer or laptop and a digital rendition that captures the feel and easy portability of the weekly print issue with the added features that an online platform allows. Although *Nature* has had an iPad version since January 2011, a version is now being released that includes the weekly edition in its traditionally structured form. Existing personal subscribers to *Nature* have full access to the tablet edition. New subscribers can choose to buy only the iPad version at a comparatively low price (see go.nature.com/pvfvqy).

Nine journals from the Nature Publishing Group are included in this app: *Nature*, *Nature Biotechnology*, *Nature Medicine*, *Nature*

Physics, *Nature Genetics*, *Nature Reviews Genetics*, *Nature Reviews Microbiology*, *Nature Communications* and *Scientific Reports*. Also included are News articles and papers published online but not yet available in print. More journals will follow next year.

At present, the accessibility of these diverse strands of content varies. Access for much of it is unrestricted. All of *Nature's* journalistic output is freely available. *Scientific Reports* is a 'gold' open-access journal — in other words, its papers are freely available, in their final published form, to anybody from the moment of publication. *Nature Communications* has about half of its content openly accessible. All of the rest is from now on available in the new iPad app, although so far only to personal print and iPad subscribers. We aim to provide access arrangements for readers who work at institutions with an online-only site licence by the middle of 2013.

The journals iPad app has been designed to deliver a reading experience that has all the clarity and convenience of print while surpassing print in its various functions. Alongside the issue-based navigation and tables of content, the new version allows the following: sharing; accessible bookmarks; saved searches (synced with nature.com); downloading of PDF files of articles; variable font sizes; figures at a glance in a figure-viewing panel; downloading and offline access to the journals; active links for references; and enhanced navigation from within the article.

We hope that those who value *Nature* will find its tablet edition even more stimulating and useful than the more traditional renditions. ■