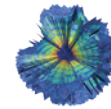


THIS WEEK

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An array of problems

Political interference in the selection process for the headquarters of the Square Kilometre Array should not go unchallenged.

When David Cameron addressed Australia's Parliament last November, the British prime minister referred briefly to the Square Kilometre Array (SKA), "the world's largest radio telescope". The project's headquarters, he noted, were in Manchester, UK. Not so. The location of the SKA headquarters — a political and scientific prize — was due to be decided last week. It was a two-horse race: the United Kingdom or Italy. But the date came and went with no news. Astronomers have been left scratching their heads.

Nature has seen internal documents that explain both the delay and Cameron's expectancy. Italy won, and the United Kingdom kicked up a fuss. It threatened to pull out. It implied that Italy could not be relied on. It demanded (and will get) a recount. It acted, in other words, as a playground bully. Science has never been immune to the ugly reality of politics, but last week's unseemly gamesmanship is a particularly sorry example, and one that should not be allowed to stand unchallenged.

It is true that the Jodrell Bank Observatory near Manchester has acted as a temporary base for the SKA since 2012, and that the British would like that to continue. But the merits of two possible sites for a permanent home — the other is a historic observatory in Padua — have been the subject of an admirably transparent selection procedure, which the United Kingdom is now trying to undermine.

The two bids were assessed on a precise set of criteria, including political commitment to provide the extra financial support expected of a host and the quality of the research environment. The SKA board agreed on a timetable and chose a selection panel to assess the bids and recommend the winner. The panel comprised SKA board directors from three of the organization's 11 member countries — Australia, South Africa and the Netherlands — and a representative from the European Southern Observatory (ESO), an international astronomy organization headquartered in Garching, Germany. The panel's recommendation to the SKA board last week was crystal clear: both locations satisfied the criteria, but Padua was the better option.

When the United Kingdom saw that it had not won, it tried to change the rules, ramping up the pressure by circulating government-level letters to SKA board members. One from the head of the UK Science and Technology Facilities Council says "the [panel's] report does not appear to properly account for the scale and approval status of our financial commitment", and that "any decision on the headquarters must consider the broader ways this will affect the project and in particular the way in which it could affect the level of political commitment to the project". Another (unsigned) letter from the UK Department for Business Innovation and Skills says: "All things being equal — which they are in terms of meeting the HQ criteria — it makes no sense to dramatically increase the risk of the project by changing leadership from the UK to Italy... Transferring leadership would require the UK to radically re-assess participation in the project."

The SKA aims to use the globe as a giant radio telescope to image the early Universe, when the first stars and galaxies were forming.

With a project this ambitious, it is perhaps not surprising that fights for control get dirty. In March 2012, South Africa was judged slightly better as a site to host the SKA telescope than Australia, but a political storm led to the decision to share the instruments. South Africa is building 3,000 dishes, and an even larger number of antennas are being installed in Australia.

Any competition for hosting the headquarters would have been undertaken in the knowledge that a non-UK winner would require a physical move. Italy may have a reputation among tabloid newspaper

"Science has never been immune to the ugly reality of politics."

readers as Europe's clown — thanks in part to years under former prime minister Silvio Berlusconi — but hard-nosed scientists looking at its reliability in international scientific projects do not need to stoop to stereotypes. Italy is a reliable partner in both CERN, Europe's particle-physics lab near Geneva,

Switzerland, and the ESO, for example. The country has competently headed organizations including the International Centre for Theoretical Physics and the International Centre for Genetic Engineering and Biotechnology for decades without problems.

Under pressure from the United Kingdom, the SKA board deferred a vote on the headquarters site to its next meeting at the end of April. It gave both countries until 20 March to submit extra material to the selection panel to confirm financial support, including their commitments if they are unsuccessful, and to address vague "operational and schedule matters; and organisational and reputational matters". The board also asked the panel to provide it with a comparative analysis "without an overall recommendation" by 10 April. These new criteria represent a move away from a transparent selection process to one that is based on murkier ground. ■

All in good time

Stratigraphers have yet to decide whether the Anthropocene is a new unit of geological time.

In western Berlin, Devil's Mountain rises 80 metres above the surrounding landscape to offer a clear view across the city. Known in German as *Teufelsberg*, the tree-covered hill looks primeval, but it was not there until 70 years ago. It was constructed as a dump for more than 25 million cubic metres of rubble cleared from the streets after the Second World War. So it is fitting that this artificial hill had a visit last year from a group of researchers assessing the geological imprint of humans on the planet.

The Anthropocene Working Group has a simple name but a very complicated job. These are the people who have to work out whether the world has entered a new slice of geological time — the Anthropocene.

As the group continues to assess the evidence, the rest of the planet has apparently made its decision. Three journals have been launched that are dedicated to research on the Anthropocene. Environmental advocates have heartily adopted the term and all it signifies, and so have many others, including artists and social scientists. And four years ago, *Nature* recommended that geologists formally accept the Anthropocene, arguing that the term “provides a powerful framework for considering global change and how to manage it” (see *Nature* 473, 254; 2011).

But although many people have already made up their minds, those whose opinions matter the most have yet to do so (see pages 144 and 171).

The Anthropocene working group is diverse: about half of the three-dozen researchers are geologists, the rest a mix of archaeologists, palaeontologists, climate experts, atmospheric scientists and representatives of other disciplines. Working without pay over the past six years, and communicating mostly by e-mail, they have been sifting through evidence and arguments about when the Anthropocene might have begun, what kind of geological markers might define it, and whether it is worthy of recognition as a separate unit in Earth’s geological history.

Despite the popular appeal of the Anthropocene, decisions relating to the geological timescale must rest with stratigraphers — researchers who study the evidence embedded in rock, ocean sediments, ice cores and other geological deposits. These people must look past the clamour and decide whether the Anthropocene is an appropriate new unit of chronostratigraphy. Their proposal will then be voted on by the International Commission on Stratigraphy (ICS) and the International Union of Geological Sciences.

The process remains conservative because the timescale is a tool used by tens of thousands of geoscientists around the world. Changes can create confusion, so the ICS requires strong scientific justification for any amendments. The fundamental question for the working group and for the ICS is whether geologists would find it sufficiently useful to define an Anthropocene unit in the rock record, which is

the physical manifestation of the timescale. The Anthropocene would probably be an epoch that would sit after the Holocene, which started with the end of the last ice age, around 11,700 years ago.

If the Anthropocene is under way, then when did it start? Initial suggestions focused on the Industrial Revolution, but momentum has picked up to set the boundary after the Second World War. Since then, the global population has increased by 180%, water use by 215% and

“Stratigraphers must be given time and space to consider the consequences of formally adopting the Anthropocene.”

energy consumption by 375%. Researchers have called this surge the Great Acceleration, and it has skewed the composition of the atmosphere, warmed the planet, eroded the ozone layer and acidified the oceans.

“The last 60 years have without doubt seen the most profound transformation of the human relationship with the natural world in the history of humankind,” says the International Geosphere-Biosphere Programme,

which has charted those changes.

It seems obvious that such broad planetary upheavals would warrant recognition on the geological timescale. But they may not be adequately reflected in stratigraphic evidence. In many parts of the globe, the geological record of the past 65 years is thin to non-existent. In the deep sea, less than a millimetre of sediment has built up, and that could be erased as ocean acidity increases. Signs of atmospheric changes are also preserved in recently laid down glacial ice, but much of that record could disappear in coming centuries as a result of global warming.

The working group still faces a considerable amount of work to evaluate whether — and how — to define the Anthropocene. If the committee or upper levels of the geology hierarchy decide against amending the timescale, the Anthropocene will not disappear. Many scientific disciplines and the public will continue to use the concept and word, in much the same way as they use the terms Neolithic era or Stone Age.

In the meantime, it is important that stratigraphers be given time and space to consider the consequences of formally adopting the Anthropocene. Any such change cannot be revisited for at least a decade, so the geological community will have to live with its decision for some time to come. ■

In the beginning

As the first true science journal marks 350 years, we must defend scholarly pursuits.

This month marks the 350th anniversary of arguably the first and longest-running scientific journal, *Philosophical Transactions: Giving Some Account of the Present Undertakings, Studies, and Labours of the Ingenious in Many Considerable Parts of the World*.

The first volume appeared on 6 March 1665, as a personal project of Henry Oldenburg, the first Secretary of the Royal Society in London, and was more of what many would regard as a magazine — with letters, book reviews and accounts of experiments from Europe’s growing cadre of natural philosophers. Almost a century was to elapse before the Royal Society officially took it over and *Phil. Trans.* began to take its modern shape.

Part magazine and part journal, *Phil. Trans.* was much more than either. It was the journal — a genuinely new innovation — in which people of inquiring minds started to throw off the shackles of ancient received opinion and ask their own questions about the world around them. It was the start of scientific enquiry as we know it today.

By 1887, the breadth of scholarship had grown so much that *Phil. Trans.* could not encompass it all in one place. It split into

streams — A and B — to cover separately the mathematical and physical sciences, and the biological sciences.

The schism was a sign of things to come. Today there are more than 40,000 scientific journals, from the hieratic to the demotic, the parochial to the cosmogonic. The arrival of electronic media is precipitating the biggest change in publishing since the invention of printing: journals are moving online, and access to knowledge, once the privilege of the educated European gentleman, is now increasingly seen as the right of any and every person — and rightly so. It would be all too easy to say that the only way now is onwards and upwards, as the bright light of enlightenment evaporates an ever-shrinking puddle of unreason.

Three and a half centuries of progress might seem a lot, but it is a tiny mote in the piebald passage of human history. Hard fought for, broad support for scholarly pursuit of a better world cannot be taken for granted.

The Library of Alexandria in Egypt was targeted and destroyed at various times between 48 BC and AD 642. For those inclined to dismiss such wanton vandalism as ancient history, think of the continuing and concerted efforts by many in the United States and elsewhere to sweep away science ranging from climate-change research to evolution. Consider that, as you read this, Islamist extremists are bulldozing the remains of ancient Assyria.

Even amid an almost uncountable profusion of journals, *Phil. Trans.* continues to thrive. All curious minds should wish it another 350 golden years. But the forces of irrationality are gaining in strength — one cannot afford to be complacent. ■

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