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Fight for the facts

Scientists must join others in standing their ground against a US leader who is anything but conventional.

On 21 January, one day after the inauguration of Donald Trump as the 45th president of the United States, millions of people took to the streets in protests across the country and around the world. The marches were spurred by Trump's treatment of women, but the focus expanded to include issues ranging from apparent hostility towards environmental regulations to disregard for the truth. Many hoped that the sobering reality of entering the White House would transform Trump's approach into something more conventionally presidential, but the early signs are not promising.

Trump's inauguration speech was heavy on populist and nationalist rhetoric that, if carried out, would probably herald the end the United States' leadership abroad. At home, he has put a freeze on hiring across the federal government, excluding the military and any positions related to national security and public safety. He also reiterated his plans to freeze regulations set in motion by his predecessor and to roll back pro-environment policies already in place.

Trump threw a bone to scientists with a pledge to explore space and to battle disease, but one of the first documents posted on the White House website was a bare-bones energy plan that emphasizes fossil-fuel development and makes no mention of the threat of climate change (see page 443). The plan takes aim at "burdensome" environmental regulations and says that the Environmental Protection Agency should focus on protecting air and water, as opposed to the climate. Although it mentions — but does not define — "clean coal technology", the plan ignores the struggling nuclear-energy sector as well as a burgeoning renewables industry that could provide countless jobs across the country in the coming decades.

In short, the energy plan is a product of cynicism and greed. Even fossil-fuel executives must recognize it as such. This would include former ExxonMobil chief Rex Tillerson, Trump's nominee for secretary of state, whose appointment is headed for approval by the full Senate after a party-line 11–10 vote by the Committee on Foreign Relations on 23 January.

If there's a sliver of good news, it's that Trump's nominees are afraid to openly impugn the science underlying global warming. In fact, Tillerson affirmed during his confirmation hearing on 11 January that climate change is real and needs to be dealt with, ideally by placing a tax on carbon. When pressed by Democratic senators last week, former Texas governor Rick Perry and Oklahoma attorney-general Scott Pruitt both affirmed the reality of global warming. Unfortunately, none seemed eager to seek a solution.

Rejecting mainstream science has become a theme for Trump. The president has met with two scientists over the past couple of weeks: David Gelernter, a computer scientist at Yale University in New Haven, Connecticut, and a vocal critic of liberal academia; and William Happer, a physicist at Princeton University in New Jersey who believes that carbon dioxide emissions are beneficial. Those meetings have spurred speculation that Trump is interviewing people for the post of chief science adviser, but it's not clear that either would have the ability — or the desire — to tap into the deep ranks of researchers and synthesize science for a sitting president.

The question remains of just how much Trump cares about that. On his first full day as president, Trump told officials at the CIA that he "very strongly believes in academics". But his early statements as president demonstrate, once again, a worrying disregard for evidence — particularly when it contradicts his claims. At the CIA, he accused the media of lying about the crowd size during his inauguration, and of manufacturing his public dispute with US intelligence agencies over findings of Russian interference in the US election. Both assertions were demonstrably false, as was his statement that the rain stopped during his speech.

"Rejecting mainstream science has become a theme for Trump."

Within two days of Trump assuming power, White House officials have found themselves embroiled in a scandal over "alternative facts". These are unique assets that the Trump administration now claims to have at its disposal. The stance is not surprising given Trump's long-standing disregard for the truth, but it is nonetheless disturbing to behold. One of the signs carried by protestors at the weekend sets a challenge for those who believe that politicians must confront the world as it is, rather than how they would like it to be: "Make America think again." ■

Slow progress

The gender imbalance in scientific publishing is still pervasive — not least in Nature.

In 2012, this journal admitted its gender bias. Following a complaint from two readers that too few News & Views articles were written by women, we totted up the numbers and realized that they were correct. Moreover, the imbalance was present in other sections of *Nature*, too. At the time, we pledged to commission more female scientists as reviewers and writers by asking editors to explicitly consider them, and to report back on progress (*Nature* **491,** 495; 2012). We did so in 2013 and the results were mixed. There was progress, but it was patchy and we conceded that we needed to keep trying, and to try harder (*Nature* **504,** 188; 2013).

It is time for another update, not least because the issue of gender imbalance in scientific publishing is the subject of a Comment piece this week (see page 455). The authors analyse data from the American Geophysical Union (AGU) and find that female

scientists are under-represented as reviewers of academic papers in the organization's journals. They also show that female and (especially) male authors and editors recommend too few women as reviewers. (Such recommendations are a common feature of peer review, but editors are under no obligation to follow them.)

Between 2012 and 2015, the latest analysis shows, 20% of reviewers of papers in the AGU journals were women. This contrasts with the 28% female AGU membership and the 27% of female first authors on AGU papers during the same period. The Comment authors say that this gender bias is mainly because of the disparity in the number of female reviewers suggested.

Internal data on the gender of reviewers of *Nature* papers show a better picture — but not by much. In 2014, 23% of our reviewers were women, and 22% in 2015. Those figures are lower than we would like, but they do show a marked improvement on previous years. In 2011, just 14% of *Nature* reviewers were women, with 12% in 2012 and 13% in 2013. (Figures for 2016 have not yet been compiled — a non-trivial task that involves the manual looking-up of names to attribute gender.)

Nature does not routinely gather and collate data on the gender of recommended reviewers. But we asked our manuscript editors to perform an informal survey of those suggested for ten recent papers they have handled. Just 141 of 1,157 recommended reviewers (12%) were women.

There are some reasons for this low figure, and these should be considered in any robust analysis of gender bias in academia. More physical-science editors responded, and those disciplines have fewer women in senior positions. Indeed, the whole issue of seniority (the participation of women in science tails off as researchers climb the career ladder, for well-explored reasons) might help to explain why so few reviewers recommended to *Nature* by male and female authors are women. Interestingly, the Comment authors report that the bias they identified was present at all ages, and suggest that the lack of female reviewers is not just down to the seniority issue.

At *Nature*, we often see the most senior of researchers in reviewer recommendations, but authors are asked to recommend rising stars too. This pool of potential referees has a much greater proportion of women. European Union statistics for some relevant fields show that women hold 33% of assistant professor and 24% of associate professor positions, compared with 13% of full professorial roles. We often pair a new referee with one who is tried and trusted to see how the new referee fares, to enable them to see reports from more-experienced reviewers and to give them an insight into our decision-making processes.

"Female participation continues to grow, although not across the board."

In the magazine section of *Nature*, female participation largely continues to grow, although not across the board. Some 25% of News & Views authors in 2015 and 2016 were women (up from 12% in 2011 and 19% in 2013). Women wrote 23% of World View articles in that combined period (12% in 2013) and 20% of Comment pieces in 2016 had a woman as a first author (27% in 2013). In News Features, 56% of full researcher profiles were of women in 2015, compared with 66% in 2016 (in 2011 and 2013, the proportions were 18% and 40%, respectively).

We hope that readers find these formal and informal statistics thought-provoking. We encourage other scientific organizations to track their own rates of gender participation, and we will continue to try to improve and report on our own. ■

New year, new aim

An incisive vaccine initiative is a good start to 2017.

Too often, after an epidemic of a new or re-emerging disease, the story is the same. Formal review committees lay out lessons for how the world can be better prepared the next time, but as the flurry of media and political attention fades, little comes of them.

It is therefore heartening that, in the wake of the horrific 2014 Ebola epidemic in West Africa, research funders and scientists have come together to address a major failing in preparedness: the fact that, although there is a long list of pathogens known to have at least the potential to cause major epidemics, approved vaccines exist for almost none of them.

For example, the coronavirus that causes deadly Middle East respiratory syndrome (MERS) was discovered in Saudi Arabia back in 2012, but there has been no serious effort to develop a vaccine against it. The virus's spread between people seems limited to those in close contact, and yet it ticks many of the boxes for an agent that could cause a pandemic were it to evolve to spread more easily between people. Similarly, an epidemic of severe acute respiratory syndrome (SARS) in 2003 caused global havoc, with a pandemic narrowly being averted by drastic public-health measures. But more than a decade later there is still no vaccine.

In fact, in a paper published last December in *Emerging Infectious Diseases*, scientists identified 37 viruses (including some you may never have heard of, such as Bwamba, Oropouche, Junin and o'nyong-nyong) that so far have caused only limited outbreaks in humans, but which seem to fit the bill as potential epidemic threats (M. E. J. Woolhouse *et al. Emerg. Infect. Dis.* http://doi.org/bxnk; 2016).

For too long, the world has fatalistically acquiesced to a status quo in which, because there is no market for vaccines against pathogens that might never cause a major problem, there is no substantial investment in developing vaccines against them. Clearly, private companies cannot be expected to invest on their own. But it is incumbent on governments to invest, and thus address this market failure, in partnership with pharma.

It is therefore encouraging that there is now a solid plan to do just that: the Coalition for Epidemic Preparedness Innovations (CEPI), launched on 18 January at the World Economic Forum in Davos, Switzerland, aims to develop and take through early clinical trials vaccines against potential threats (see page 444). It already has enough cash to work on three — MERS, Nipah-virus infection and Lassa fever.

Some US$200 million of CEPI's initial $460-million funding comes from just two donors, the Wellcome Trust and the Bill & Melinda Gates Foundation, with the rest coming from the governments of Norway, Germany and Japan. Budget and election cycles in several other countries have delayed further contributions, but it is crucial that more countries come on board, allowing CEPI to take on additional targets. Some nations may wish to wait, and it is only right that CEPI should prove its worth, but there seem few reasons that it should not succeed.

The difficulty of developing vaccines against HIV, tuberculosis and malaria must not cloud expectations. As researchers point out, most pathogens don't have the vast sequence diversity and mutability of HIV, the TB bacterium's high transmissibility and ability to lie dormant, or the malaria parasite's cunning evasion of the immune system by generating alternative surface proteins. Making vaccines against many of the viruses on the most-wanted list should not be a huge challenge.

CEPI comes at an exciting time in vaccine research. There's a move away from a single-vaccine approach for any one disease, to developing vaccine backbones for use against multiple infections. This promises to greatly speed up vaccine development — and perhaps even to allow rapid development of vaccines against previously unknown viruses.

At a time when short-termism and shortsightedness are rife, and political rhetoric often prevails over action, CEPI's founders are offering vision and foresight — it's an insurance policy that more governments, including the United States, would be well advised to back. ■