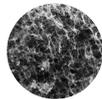


THIS WEEK

EDITORIALS

WORLD VIEW How to rein in the threats to reproducibility **p.435**



MATERIALS Graphene gains exceptional flexibility in deep freeze **p.436**

PALAEONTOLOGY Enormous ancient carnivore might have ruled African beasts **p.438**

Stop denying air-pollution risks

Research linking fine particulate pollution and premature deaths is under attack in the United States and other countries.

Air pollution kills. Fine particles produced by cars, industrial plants and numerous other sources are particularly dangerous to human health. That is what scientists across the world have convincingly established over the past quarter of a century, and air regulations have been gradually tightened in most Western countries as a result. Even so, the World Health Organization (WHO) estimates that exposure to outdoor air pollution accounts for 4.2 million deaths each year. And in recent years, something insidious has happened in some places: the science linking air pollution to premature deaths has come under attack.

The problem is most acute in the United States, where the administration of President Donald Trump is bent on dismantling a variety of environmental and public-health regulations. At a meeting last month, a science panel that advises the US Environmental Protection Agency on air-quality standards was divided on the extent to which fine-particle pollution causes premature death. The panel was chaired by Tony Cox, a Trump appointee, statistician and consultant whose research has been funded by oil, gas and other industries, and who has long questioned evidence supporting the link.

Septicism about air pollution's health impacts has arisen in other countries, too, including France, Poland and India. And in Germany, 140 lung specialists signed a statement released in January that cast doubt on the health impacts of nitrogen oxides (NO_x) and fine-particle emissions from vehicles. The statement acknowledged epidemiological evidence that people in areas with high levels of NO_x and fine particulates tend to die slightly earlier than those elsewhere, but questioned whether pollution was the cause.

Earlier this month, the German national academy of sciences set the record straight. NO_x, and particularly nitrogen dioxide, increase rates of respiratory illnesses such as asthma while also contributing to the formation of fine particulates. The particulates contribute to premature death by increasing the risk of respiratory and cardiovascular diseases, as well as of lung cancer.

These conclusions build on a body of evidence collected over decades. In 1993, researchers at the Harvard School of Public Health in Boston, Massachusetts, led a landmark study assessing the impacts of pollution in six US cities (D. W. Dockery *et al.* *N. Engl. J. Med.* **329**, 1753–1759; 1993). After controlling for smoking and other potential confounding factors, they found that people tended to die earlier in cities with dirty air than in those with clean air — largely because of the presence of fine particles. A 2017 study of nearly 61 million people reported that fine-particle and ozone pollution — even at levels lower than the current US standard — were associated with increased death rates (Q. Di *et al.* *N. Engl. J. Med.* **376**, 2513–2522; 2017).

Cox and other sceptics often argue that the epidemiological evidence cannot prove that air pollution causes premature deaths. But that is deliberately ignoring the weight of evidence from an array of rigorous epidemiological studies, aligned with other sources. Scientists have identified mechanisms by which fine particles affect health, analysing

the toxicological and physiological effects using *in vitro* methods, mice and human studies. So, many countries are improving pollution control.

Environmental regulations to curb air pollution impose steep costs on a variety of industries, but questioning the evidence won't make it go away. More than 90% of the world's population lives in regions that break WHO air-quality guideline limits. Now is not the time to undermine efforts to clean air — it is time to strengthen them. ■

Brief reminiscence

Nature's 150th anniversary offers a chance to celebrate the quirky papers of our past.

Were it not for the enduring name, today's *Nature* readers could be forgiven for thinking that an issue from 100 or 150 years ago was a different publication altogether. We have changed enormously, rightly evolving with the needs of the research community. But our 150th anniversary gives an excuse for a little retrospection, and one article format, despite being discontinued in 2006, holds a special place in the hearts of many readers and editors — Brief Communications. These one-page pieces of original research were a taster menu of the important, interesting, quirky and, on occasion, downright bizarre.

That past is still accessible — the entire *Nature* archive, dating back to 1869, is available online — and offers some scientific delights. One goal in this anniversary year is to mine some of these gems, so *Nature* editors picked out a few favourite examples of Brief Communications and its predecessor, Scientific Correspondence. These included New Zealand's 'exploding' mistletoe, a highlight of our 1995 Christmas issue (<http://doi.org/d98k9v>). (Pollinating birds eager to get at the mistletoe flowers twist the unopened, ripe buds, with dramatic consequences.)

Other offerings include innovative, mathematically inspired ways to knot a tie (<http://doi.org/c73dk5>) and the optimum walking speed on Mars (<http://doi.org/d7mnb2>) — 3.4 kilometres per hour, down from 5.5 on Earth, owing to lower gravity. Still more looked at how in-store music affects product choice (<http://doi.org/d3g2v4>) — in this case, German and French wines; the fractals of Jackson Pollock's drip paintings (<http://doi.org/c9km98>); and why popcorn pops when the kernels of its close relatives refuse to (<http://doi.org/dknv77>).

When we bid farewell to Brief Communications, we wrote: "Perhaps today's pressures are forcing science to become more earnest and more specialized, as well as demanding greater detail in presentation" (<http://doi.org/d4bzvc>). Although we do not shy away from the quirky and the delightful, time has shown that this trend in the reporting of original research was well observed. ■