

# THIS WEEK

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## Counting the cost

*As more and more of its ocean-sciences budget is eaten up by operational and maintenance costs, the US National Science Foundation should learn to take a long view when investing in major projects.*

One should never, as the saying goes, look a gift horse in the mouth. So when the US National Science Foundation (NSF) was handed stimulus cash after the collapse of the wider economy, it is not hard to see why agency bosses rushed ahead with funding some shiny new projects. But now the hungry horse is their responsibility and it is gobbling from the agency's shrinking nosebag. Something has to give.

A decade ago, things were looking up for the science-funding agency. Budgets had been rising steadily, thanks to a supportive Congress. In 2007, President George W. Bush signed the America COMPETES Act into law, which singles out the NSF for special investment in innovation research. And even after the US economy nosedived in 2008, there was a silver lining for the NSF: an extra \$3 billion in stimulus funding from the government's economic-recovery package.

By law, the NSF was obliged to spend the stimulus windfall quickly, so it naturally looked to inject cash into projects that were 'shovel-ready' — those that had already been designed and were just waiting for investment to get started. Of the many things that the agency did with the cash, it chose two large projects in its ocean-sciences division. A group hoping to build an Alaskan research vessel received more than \$100 million to begin construction, as did a project looking to establish a network of ocean observatories in the waters surrounding the Americas (see page 480).

Even then, the NSF should have anticipated that the big budgets would not last and planned accordingly. It did not, and now faces the reality of the aftermath of all that spending. Once the pot of money allocated to construction has gone, the agency must start to pay operational costs for these expensive projects. Both the Alaskan vessel and the Ocean Observatories Initiative (OOI) are set to come online in 2015, and the ocean-sciences division will foot the bill. In a presentation to the National Science Board last month, division director David Conover warned that the division is already spending more than half its money on maintaining facilities — at the expense of core science projects. And that percentage of facilities costs is only expected to grow.

That could hurt another long-standing part of the ocean-sciences division — scientific ocean drilling, in the shape of the drilling ship *JOIDES Resolution*. Faced with growing facilities demands, the NSF is considering cutting the amount it spends on the *Resolution* each year, such that its time at sea might shrink from the eight months a year of science it does at present — which is, in turn, less than the 12 months a year it worked a decade ago (see page 469).

Ocean drilling has already absorbed cut after cut; it must be spared complete dismantling. The *Resolution* is a hugely successful science programme, one that continues to yield multiple papers in top academic journals each year, more than four decades after scientific ocean drilling began. It is also highly international; in the past decade, 758 scientists from 23 countries have sailed aboard the *Resolution* under the mantle of the Integrated Ocean Drilling Program. One-quarter of those

were graduate students, of whom nearly half were women.

The NSF faces difficult choices, as do other cash-strapped funders around the world. In the case of the NSF's ocean sciences, it should choose to pay to keep the *Resolution* working. It has little leeway on the expensive and untested OOI, which has been mandated by Congress. (Although, notably, other countries, such as Australia and Canada,

**“When money gets tight, some dreams simply have to be delayed.”**

have managed scientifically useful ocean observatories on a smaller, more affordable scale.) That leaves a decision to be made on the country's ageing academic research fleet.

Even in these tight budgetary times, the NSF is about to embark on another major construction push in the ocean sciences: it is looking to build as many as three regional research vessels. These are much-needed replacements that would study algal blooms, ocean acidification, fisheries impacts and other science of great societal relevance. But they are coming at just the wrong time and should be postponed.

As it awaits confirmation of a new director, the NSF would do well to reconsider the way it builds long-term strategy. Building big, shiny facilities is all well and good in times of plenty. When money gets tight, some dreams simply have to be delayed. With politics, as with horses, there is no sure thing. ■

## Time for change

*Angela Merkel needs to tackle the issue of Germany's uneven university funding.*

With her triumph in the German parliamentary elections on 22 September, Angela Merkel's popularity has reached new heights. Her bloc — the Christian Democratic Union and its Bavarian sister party — took 41.5% of the vote, just five seats short of an absolute majority and almost 8% more than her share in the 2009 election. But as the Free Democratic Party, her junior coalition partner in the last government, failed to win the required 5% of votes and will no longer be represented in parliament, Merkel must seek a new political partner. A grand coalition with the Social Democrats, who won 25.7% of votes, seems the most likely option. It could be a good one for science as well.

Merkel no doubt owes her victory to Germany's economic stability and her firm stance on the euro crisis, which has made her the pre-eminent political figure in Europe. Her government has also cut German unemployment by almost 40% since 2005, to 6.8%. And Merkel has benefited from her decision to pull the plug on nuclear

energy by 2022 in the wake of the 2011 accident at the Fukushima Dai-ichi nuclear-power plant in Japan. The cost and technical challenges of the *Energiewende*, the move to a non-nuclear, low-carbon energy system (see *Nature* 496, 156–158; 2013), will dominate her third term in office. As will coping with the welfare and health pressures brought about by an ageing population.

A lot of good science will be needed to meet these challenges. Wisely, the government has increased research and technology expenditure by some 60% since 2005 (see *Nature* 501, 289–290; 2013). Today, Germany's science landscape is more diverse, more competitive, better funded and less parochial than at any time since the Second World War. Many Max Planck Institutes offer terms and conditions that few other places in the world can match. National research centres, such as the Alfred Wegener Institute for Polar and Marine Research, are among the leading hubs in their fields, and the model of the Fraunhofer Society, which promotes applied research in conjunction with industry, is now being copied by the United Kingdom. All these organizations, as well as the DFG — Germany's central grant-giving agency for university research — have benefited from the Pact for Research and Innovation, which has given them generous budget increases over the past few years. Merkel has promised to continue this pact beyond 2015, which would guarantee them budget increases of 5% each year.

But not all is rosy. German scientists are at a disadvantage in stem-cell research compared with countries such as Sweden or the United Kingdom. German law prevents the importation or use of any human embryonic stem cells except those created for research before 1 May 2007. The Free Democrats are the only party to have backed more liberal stem-cell rules in the past, and their absence from parliament makes a revision of the law unlikely.

## Homes for bones

*A dispute over the skull of an Italian cheese thief highlights the enduring debate over repatriation.*

It is understandable that indigenous communities want to take control of their cultural history. In the past few decades, Native Americans, Australian aborigines, Australian Torres Strait islanders and other groups previously colonized and suppressed by European nations have engaged museums in a rightful debate over whether ancestral bones should be returned to their communities of origin.

The Smithsonian Museum in Washington DC began to return some Native American bones in the late 1980s. And in April this year, the German Museums Association formally agreed that human remains collected as part of a violent conflict should be repatriated. Museums are cautious, however. They recognize the dangers of breaking up scientifically important collections — which have over the decades and centuries become part of world heritage in their own right — if claims to ownership are not clear-cut.

A bizarre case on this sensitive theme is building to a conclusion in Italy. Almost a year ago, a judge in the southern region of Calabria ruled that the skull of a man called Giuseppe Vilella should be returned (“for decent burial”) to the small Calabrian town of Motta Santa Lucia, where Vilella was born around 1801. The skull is a key exhibit in the Cesare Lombroso Museum of Criminal Anthropology in Turin, northern Italy. The University of Turin, which owns the museum, has appealed the ruling and a decision is expected in December.

The case is a one-off, but it highlights a pressing need for greater legal protection of Italy's wealth of historically important scientific objects. In 2004, a law extended protection of the country's remarkable artistic and archaeological heritage to scientific collections in public museums. But Motta Santa Lucia's claim would take the skull out of

Life could also be better for some plant biologists. Research on genetically modified (GM) crops has all but stopped owing to public hostility and a lack of political support. Since 2005, all experimental releases of GM plants have had to be registered to give their exact location and time of planting. This has allowed opponents to destroy nearly every field trial. As a result, for the first time in 20 years, there were no GM field trials in Germany this year.

**“The priority for Merkel should be to strengthen the country's underfunded universities.”**

The government must rethink its anti-GM policies, which are not supported by any scientifically credible risk assessment. With scientific literacy in the basics of plant breeding and genetics at a low level in Germany, public debate about the field is wide open to quacks and ideologists.

But the first priority for Merkel, as *Nature* has called for previously, should be to strengthen the country's relatively underfunded universities. The universities are the responsibility of the country's 16 states — a funding model that has proved incapable of supporting powerhouses to rival the likes of Harvard or Oxford. The €4.6-billion (US\$6.2-billion) Excellence Initiative, jointly funded by central government and the states, has injected some much-needed federal money into the university system. It would take just a two-word constitutional change to allow the government permanently to support state-funded universities — or even to create national research universities similar to Switzerland's Federal Institutes of Technology. In the past, the second chamber of parliament has blocked such an amendment, but it will find it harder to keep up its resistance if Germany ends up being ruled by a grand coalition. ■

the collection — and into legal limbo.

Little is known about Vilella other than that he ended his days in a prison near Pavia in northern Italy, where he had been held for stealing goats and cheese. After he died in 1864, Lombroso, then a professor of forensic medicine at the University of Pavia, acquired his skull and noted an abnormal hollow on the inside back surface. This set Lombroso on course to develop a notorious theory that criminality was an inborn characteristic recognizable through particular anatomical features. He went on to collect hundreds of other skulls to back up this theory. It proved incorrect, but does demonstrate Lombroso's revolutionary willingness to consider that behaviour could be influenced by brain biology.

The judge's ruling is frustrating. Without calling on scientific expertise — a tendency of Italian judges that has been increasingly criticized (see *Nature* 491, 7; 2012) — he said that because Lombroso's theory was known to be wrong, there could be no justification for keeping the skull in a museum.

The inhabitants of Calabria can hardly be considered a suppressed indigenous population. But a tiny political group called the Neo-Bourbon Movement (*Movimento Neoborbonico*) thinks that the analogy holds. Whereas conventional history considers the creation of the Kingdom of Italy in 1861 to have been a liberation of the south by the north, the Neo-Bourbon Movement views it as an invasion that harmed the southern cultural identity. The movement persuaded the mayor of Motta Santa Lucia to bring charges against the Lombroso museum.

The 2004 Italian cultural-heritage law is set to be updated soon, providing a perfect opportunity to extend protection explicitly to individual scientific objects. This would close a legal loophole and sensitize judges to the true value of the objects, which, like artworks, should not in most circumstances be destroyed or lost to the public.

In the meantime, the Lombroso museum is allowed to keep Vilella's skull on display. The bones await their fate on a shelf just a few metres away from a cabinet that holds the entire — less sensitive — skeleton of Lombroso himself. ■

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