Correspondence

Funding open-access papers after 2024

Several publishers are concerned about the timeline for implementing Plan S, the European initiative that will make all research papers free to access (see *Nature* **561**, 17–18; 2018). Their main concern is whether their markets will be ready for a 'pay to publish' model by 2024, when funders' support for transformative agreements ends. As co-chairs of the implementation task force of the international research-funder consortium cOAlition S (see www.coalition-s.org), we wish to clarify our position with regard to financially supporting the important transition to full open access after 2024.

We recommend that open-access publication fees should be covered by funders or research institutions, not by individual researchers (see go.nature.com/33rdttn). Our 2019 guidelines for implementing Plan S indicate how we, as funders, intend to help finance full and immediate open-access publication until 2024 (see *Nature* https://doi.org/gf3x2r; 2019).

After 2024, we will be encouraging institutional libraries and large consortia to switch from 'read and publish' agreements with publishers to 'pure publish' deals for portfolios of subscription journals that have become open-access journals. The cOAlition S funders will contribute to financing such deals, which will be more cost-effective and have fewer transaction costs than a single-paper charging system. The financial transaction would then no longer be between the author and the editor or journal, removing any concerns about perverse incentives for lax quality control.

We look forward to working with publishers who demonstrate leadership in this important new era of research reporting.

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Ditch mouse swim test for depression

Having practised psychiatry for 24 years, I was pleased to see that the value of the mouse 'forced-swim test' is being called into question by researchers studying human depression (*Nature* **571**, 456–457; 2019). Besides being shockingly cruel, this behavioural test misses the mark in approximating clinical depression in people.

Physical and emotional abuse (such as that associated with the test) is likely to induce hopelessness in humans and animals alike. In my experience, however, hopelessness is just one symptom of clinical depression in humans; abused people do not always meet the full criteria for major depressive disorder; and most individuals with the disorder are not currently being abused.

In my view, the complexity of human-brain function means that interpretations based on simplistic animal-behavioural testing are questionable. Data from clinical studies and from technologies that use human induced pluripotent stem cells offer a more rational approach for research into mental health.

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Enable accreditation of scientific software

We would see improvements in the long-term accuracy and reliability of academic open-source software if journals required submitted software to be accredited, and if funders were to establish a mechanism for accrediting it (see *Nature* **571**, 133–134; 2019).

Funding bodies could improve the quality and reproducibility of scientific software by creating a software-engineering task force that would cover code reviews, training workshops and standards development, for example.

A software-standards accreditation scheme from large funding organizations would carry considerable clout and help to usher in cultural change. The scheme would ensure minimum standards in reproducibility, documentation and security. Different aspects such as code coverage (the proportion of code that is automatically tested) could be evaluated using automated metrics and tests.

Public parts of code would be subject to automated vulnerability testing for common security issues. They would also need to have basic application-programming-interface documentation, which describes how programmers can use each software function and how other code can interface with it.

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Keep a close eye on the tiger

The good news that India's wild tiger numbers have been increasing by 6% annually since 2006 is offset by reported declines in their habitat (see go.nature.com/2tig959). Habitat loss is a particular concern for the genetically unique populations in the northeast of the country. Conservation efforts must now focus on protecting those areas and improving the connectivity of the habitat corridors that are crucial for the animals' dispersal.

Tiger surveys, produced in conjunction with the Wildlife Institute of India, are run every four years by the Indian government. The 2018 survey was unprecedented in intensity and scale, with 77,000 tiger photographs taken from motion-triggered camera pairs placed in 27,000 locations. Together with some 35 million photos, it identified more than 80% of the country's 3,000 tigers.

Surveys on this scale entail sifting through tens of millions of wildlife photos, of which only a tiny fraction are of tigers. Research teams in India and elsewhere are developing artificial-intelligence tools to automate the process. This will improve conservation efforts worldwide by teaching us more about the effects of human pressures on the abundance and distribution of wildlife.

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Testing the impacts of sea-bed mining

Our DISCOL experiment of 1989 was intended to explore some of the environmental impacts of sea-bed mining (see *Nature* **571**, 465–468; 2019). It did not 'simulate' industrial mining of the deep sea as you imply, because it did not cause the type and extent of sea-floor disruption and habitat destruction that would be associated with commercial extraction processes. We simply provoked a mechanical disturbance of the sea floor and studied the recolonization and restoration of the disturbed area over a seven-year period.

Until industry has developed a test system for extracting metalliferous nodules from the sea floor, it will not be possible to simulate the actual impacts of mining or to monitor its effects on sediments and communities. It will then take time to do the environmental investigations and evaluations that are required before commercial mining can proceed.

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