

to manage, regulate and promote the use of all of a nation's natural resources. The 2010 Deepwater Horizon oil spill, for instance, resulted in the dissolution of the DOI's Minerals Management Service; it became clear that one service could not oversee offshore oil and gas development, collect royalties and enforce regulations and safety. As Black notes, the incompatibility of the DOI's multiple missions — for instance, those concerning resource development and environmental protection — led to the foundation of competing federal departments and agencies, such as the Forest Service, Environmental Protection Agency and Department of Energy. In my view, this is less a failing of the DOI than a natural evolution: the emergence of spin-off agencies in response to perceived need represents the democratization of science.

I reflect on this book following the mid-September Global Climate Action Summit in San Francisco, California, organized by outgoing state governor Jerry Brown. Brown was nicknamed 'Governor Moonbeam' during his first tenure in the post more than 40 years ago, in part for his embrace of Earth-observing satellite technologies. Landsat — the Earth-observation programme that emerged from a joint enterprise of NASA and the USGS — provided a scientific base from which to improve understanding of resources and the environment. However, in Black's telling, it has been "a tool to further capitalist exploitation", embraced by an "array of well-meaning scientists and unscrupulous dictators".

Given California's economic reliance on the technology industry, Brown's advocacy of high-tech monitoring in pursuit of an aggressive environmental agenda might look self-serving. His vision might one day even be called an expansion of the Californian empire. And it is true that environmentalism should never be immune to critiques of its potential to suppress poorer countries' pursuit of development and opportunity. But to view the development of US capabilities in science and technology over the DOI's long and complicated history solely through the lens of expansionism, greed and imperial tendencies belies the complexities of the world we all live in and the fundamental part that scientific progress plays. ■

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Helena Asomoah-Hassan, university librarian at KNUST, Ghana, being interviewed for *Paywall*.

PUBLISHING

## Open access — the movie

Richard Poynder views a documentary on the tug of war over paywalls in scholarly publishing.

**B**illed as a documentary, *Paywall* would be more accurately described as an advocacy film. Its intention seems to be to persuade viewers that the paywalls that restrict access to journal content online are an unnecessary hang-over from the print era, and now serve only to perpetuate the excessive profits that legacy publishers such as Elsevier, Wiley and Springer Nature make from the public purse.

The film makes a convincing case that the paywall system creates problems — and that universal open access (OA) to scholarly articles would be better for society. But it fails to adequately explore the thorny challenges that arise with OA publishing. These include the fact that the publishers castigated would continue to dominate scholarly communication in an OA world; the increasingly expensive 'pay-to-publish' model, which substitutes inequities in access for inequities in affording publication; and the rise of predatory publishing. And although *Paywall* acknowledges that current reward systems have slowed the progress of OA publishing, it does not

**Paywall: The Business of Scholarship**

DIRECTOR: JASON SCHMITT

*Open Society Foundations* (2018)

address the puzzling question of why academics have proved so reluctant to make copies of their published papers freely available in their

institutional repositories.

*Paywall* features more than 70 interviews. People represented include: Richard Wilder, associate general counsel at the Bill & Melinda Gates Foundation; Wikipedia Library head Jake Orlowitz; and Alexandra Elbakyan, founder of Sci-Hub (a website that offers free access to more than 70 million illegally downloaded academic papers). Rachel Burley, publishing director for BioMed Central and SpringerOpen, speaks for Springer Nature.

The film ranges over issues such as journal price inflation, researcher evaluation and impact factors, and the disparity of access between the predominantly wealthy global north and the mostly lower-income global south. The film is funded by the Open Society Foundations in New York City, which was created by ▶

► philanthropist George Soros in 1993, and was instrumental in the formation of the OA movement.

Director Jason Schmitt — a scholar of communications and media at Clarkson University in Potsdam, New York — made the film to bring the discussion to the public at large. Yet most of the screenings are scheduled at universities, so how broad an audience it will find is an open question.

Schmitt wrote to me: “Publishing top-tier research journals is complex and costly. I know publishers provide an important service. But I feel that at the current technological bandwidth, we don’t need the sheer number of journals controlled by large publishers.” He describes the scholarly publishing market as a US\$25.2-billion-a-year industry. Heather Joseph, executive director of the global OA advocacy group the Scholarly Publishing and Academic Resources Coalition, puts the figure at \$10 billion.

The film singles out Elsevier for most criticism, eliding the fact that the company is simply more successful than most for-profit legacy publishers at doing what they all do. Schmitt wrote me that he tried to achieve balance, but that Elsevier declined to be part of the film, so it was unable to “show the positives and attributes of their business model”. Instead, the witness for the defence is Will Schweitzer, product-development director at the American Association for the Advancement of Science in Washington DC, publishers of *Science* and other journals. He says: “Do we act effectively as a responsible midwife for these important scholarly concepts or ideas, and make them accessible to the world and distribute them, and reinvest in the community? I would say yes.”

Subscriptions, Schmitt argues, unnecessarily restrict access to research. Moreover, prices routinely increase faster than inflation — and library budgets — so journal subscriptions are regularly cancelled, and paywalls grow.

Paywalls hit researchers from the global south hardest. A 2001 World Health Organization (WHO) survey found that 56% of research institutions in very low-income countries had no subscriptions to international scientific journals. To address this, global agencies worked with major publishers to offer researchers in poorer countries free or low-cost access to articles. Initiatives include the Hinari Access to Research for Health Programme, run by the WHO, and Access to Global Online Research in Agriculture, run by the Food and Agriculture Organization of the United Nations (these programmes and others have now been subsumed under Research4Life). Yet these initiatives are regularly criticized for creating dependency and “commodifying legitimacy”.



JIM RICHARDSON/NGC/GETTY

The University of Oxford, UK, ran out of funds for some open-access publication charges early this year.

The film offers telling examples. Nigerian physician Ahmed Ogunlaja, for instance, explains that local doctors are constantly confronted with paywalls. Another interviewee — Tom Callaway, head of outreach to universities at open-source software company Red Hat in Raleigh, North Carolina — relates that he could not afford to research his wife’s pulmonary embolism. Without a subscription, each paper costs an average of \$30–40, and it is not possible to know whether they are relevant before paying.

I agree with the film that universal OA is far preferable to subscriptions. Combined with open data, it would make science more efficient, not least because more scholars, independent researchers and citizen scientists would be able to contribute to and build on published work. Greater openness could also help to address problems of reproducibility, fraud and research misconduct. And the increasingly interdisciplinary work necessary to address grand societal challenges — from climate change to food security — is better enabled by OA.

The film mentions ‘green’ OA (in which researchers deposit copies of their own papers in online repositories), but seems more focused on ‘gold’ OA, in which publishers make papers freely available.

The weakness of *Paywall* is that it fails to adequately address the challenges of OA. Among the biggest are article-processing

**“Greater openness could help to address problems of reproducibility, fraud and research misconduct.”**

charges (APCs). The now-dominant OA model pioneered by publishers PLOS and BioMed Central, both founded in 2000, demands that authors or their funders pay APCs to make work freely available. But many cannot afford the charges, even at leading universities in wealthy nations. Legacy publishers all now also offer gold options that set APCs at levels designed to preserve current profits. Thus, the very publishers that *Paywall* criticizes will continue to dominate, because (as the film points out) researchers have incentives to publish in their prestigious journals. And for those in the global south, APCs are invariably unaffordable. Waivers are sometimes available, but authors often find they are not eligible. The problems of both affordability and equity will persist.

The film also fails to discuss other pressing issues. These include a lack of consensus on exactly what OA is and how it should be achieved, and the continuing indifference to it in the research community — consider that many academics do not self-archive their papers even when mandated to do so. Moreover, because many OA papers have no licence attached, they are susceptible to being placed behind a paywall later, making openness a fragile condition. It’s ironic, too, that the most successful OA initiative is Sci-Hub.

As a piece of advocacy, *Paywall* is compelling enough to attract new converts. It will not, however, educate the public in the complexities of open access. ■

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