PaleorXiv – Fossil News

Paleontology, perhaps above all other research fields, has always enjoyed an enormously popular status. New dinosaurs continue to enrapture public audiences, and are certainly the most coveted discoveries by palaeontologists for their high media appeal. New Jurassic Park spin-offs still see millions flocking to cinemas, in spite of their questionable scientific accuracy.

However, it is more than likely that if *Indominus rex* were to be discovered as a real, new species, most of the interested public would not be able to actually read about that research discovery.

This is the direct consequence of a generally archaic publishing system, whereby researchers often unwittingly hand over the rights to their research discoveries in exchange for the coveted prestige associated with particular publishing venues. This simple transaction is then leveraged by commercial publishers who make their money by preventing access to this research through a system of 'paywalls', often charging individuals up to $40 to access a single article.

The result of this is that much of the core research in Paleontology remains locked away from the public eye. Professional researchers are often in a fortunate position of having their institute fork out excessive fees for access to the very research they create and the public often fund. Ultimately, this led to the creation of a system of 'knowledge apartheid' whereby access was dictated by either financial privilege or elite academic status.

As such, publishers are still very much in the hangover phase of printed journals, and scientists are only slowly waking up to the immense communication power of the Web. However, much less of the published record in Paleontology is actually available to the public than we might like to think. But this is gradually changing.

Generally termed the 'Open Access movement', researchers, publishers, librarians, policymakers and research funders are all coming together to make enormous changes in providing public access to research. This seems to be part of a process of increased democratisation of knowledge, moving away from a state where much of it is, perhaps wrongfully, left in the hands of private corporations.

One of the huge implications of an increase in public access to our core knowledge archive regards how we all communicate that research – the interplay of access and accessibility. Often, intermediaries, such as journalists and professional science communicators, were required to take research and make it more digestible for non-specialist audiences. Now, however, those audiences have direct access to the source material, and can learn much more than was often previously possible.

But why is this important? Well, anyone who pays attention to the world around them will know that we're currently going through a global information crisis and, with that, severe challenges in scientific literacy. The rise of the 'alternative facts' and 'fake news' phenomena means that it is crucial that the highest quality information is publicly available to people to combat the propagation of misinformation. This is why Open Access matters, and for all research.

While there are certainly many dinosaurs in Congress, Paleontology doesn't tend to feature that much in high-level socio-political debates. However, with the enormous public appetite for Paleontology, and the implications of our research for hotly debated topics like evolution, it is crucial that the public has access to core research outputs now more than ever.

Open Access, therefore, emphasises the collective responsibility we all have to make sure that our research is as accurate as possible, and that we are also communicating not just the results, but the

process of science. We can use Open Access to teach others how to think critically, how to use and process scientific evidence, and how to engage citizens with the scientific process. 'Teach a man to reason and he will think for a lifetime.'

So we don't want more barriers to research. We want and we need less, and preferably none. Breaking down the original financial barrier of access opens up the gateway for increasing accessibility in order to maximise the uptake and re-use by different audiences. This includes transcending or overcoming potential issues to do with language, technical infrastructure, software, disabilities, and anything else which prevents research from being accessible. These are barriers to digestion, understanding, and re-use.

What this means is that Open Access provides a mechanism for a more knowledge-equipped society, and that's pretty awesome. This isn't just about dinosaurs either, but more broadly about a greater public understanding of science, a more knowledge-equipped society. This means ultimately more informed debates about climate change, evolution, natural resource consumption, mental health issues, drugs, and many other key debates of our time.

Thankfully, paleontologists are making great strides in doing this for our field at multiple levels. Much fantastic research is now published in Open Access journals, where anyone has the chance to enjoy new discoveries and to help educate themselves and others. Researchers are taking to the internet with gusto, embracing the power of Web 2.0 technologies to set up YouTube channels, podcasts, and blogs, all to help leverage this new level of access and broadcast Paleontology to the masses.

As a PhD student in the UK, I pledged to make all of my research Open Access so that anyone could read it, should they be crazy enough to want to. However, I had the backing of an incredibly wealthy university to sustain this, and became increasingly aware that many of my colleagues were not as fortunate in this. Some of the most popular journals require fees of $3-6000 to publish in, thereby creating a second level of financial inequality on the author side. I don't see how that helps Open Access progress equitably.

This lack of fairness is one of the reasons that led me to help develop PaleorXiv, a platform where any researcher can instantaneously upload their papers, either before or after peer review, and all for free. Researchers can then go on to publish their research with any other journal, without the worry of finding the money to make it Open Access at source, or having it paywalled. This fee-free model is based on the arXiv, an incredibly popular hosting service built in 1991 by and for the physics and maths communities. arXiv is so successful, that it receives more than 8,000 submissions a month now, and different subsections of it constitute 4/5 most highly-cited sources in physics and maths. Imagine if we can do the same for Paleontology!

My probably far too ambitious aim is to have every single paleontologist publishing their work on PaleorXiv. This is not only to make their research freely available to everyone, but also for them to receive more rapid feedback from the community while papers make their way through the largely slow and laborious traditional publishing process. One of the most important aspects of this, for me, was the decision to engage the community in creating a set of submission guidelines to address any potential concerns they might have. My hope is that by working with the community rather than on the outside, my quite high expectations for success stand more chance of being achieved!

The only possible result of all of this is a more informed society. While information can potentially be mis-used, this has always been the case for research, and probably always will be. Hoarding away our knowledge though, is the worst possible approach to combating this. By opening it up, and

giving information the light it needs for people to be able to verify, communicate, and re-use it, we create the foundations for increased public literacy,

What this ultimately creates is a system of knowledge equality for us all, and having 100% of Paleontology research available for anyone. If that's not something worth committing to, then I don't know what is.