Library of Science, where the commenting system is more successful, only 10% of papers have comments, and most of those have only one.

Last week, the US National Center for Biotechnology Information became the latest publisher to attempt to corral this online discussion. It is opening up PubMed, its online repository of abstracts of some 23 million scientific papers, to comments. If online commenting on research papers or abstracts can flourish anywhere, surely it will be at PubMed, the site at which so many biomedical researchers begin their investigation of the literature. Visibility should be high, after the site emerges from its restricted pilot stage. And next week will see the launch of bioRxiv, the latest attempt to mimic the physics preprint site arXiv for biomedical sciences; this site will also encourage comments.

The early signs for the PubMed trial are promising. Among the first 200 comments, there has been some apparently useful self-criticism: for example, Andrew Kniss of the University of Wyoming in Laramie, posted on his own 2006 paper, saying that "our conclusions with respect to field management of the disease went beyond what the limited data could support".

What PubMed has going for it is high traffic. But what has yet to emerge, and what could dictate how scientists use it, are the boundaries of online conduct that it will set, and how it will tune into the constructive criticism needed for genuine post-publication review of findings amid the noise and static that passes for much online debate.

Alarmed at the tenor of criticism when it concerns misconduct, some editors have tried to rein in online discussion, and to bring it within the limits of conventional debate. But attempts to dictate terms are likely to backfire. In a recent editorial in the journal *ACS Nano*, for example, the editors asserted that "the numbers of blogs, twitter messages, etc. in which individuals accuse others of academic fraud are steadily rising" — although they did not provide evidence for this. And they asked that suspicions of plagiarism or data manipulation be reported directly to a journal, rather than posted openly online (W. J. Parak *et al. ACS Nano* **7,** 8313–8316; 2013). It was others' "privilege" to be able to comment on a journal's decision on a blog afterwards, the editorial added.

Although written with concern for the fair treatment of scientists who suffer damage to their reputation when comments are made irresponsibly, the editorial raised the hackles of chemistry bloggers who have pointed out egregious examples of image manipulation in papers — and who understandably consider that it is they, as much as the journals, who are doing the community the service (see go.nature.com/cplnfd). It is better to ask that debate be civil, responsible and courteous, than that it not appear online at all.

"It makes sense to digitally tie the research and the comments together."

Does it matter just where online these discussions take place? Not in the short term — even the most obscure blog discussion can catch a wave and throw an academic debate into the mainstream. But if a longer-term goal is to leave some permanent signpost to help others navigate the scientific landscape, then it does make sense to digitally tie the research and the comments together.

For this to happen, PubMed Commons and digital publishers either need to become a hub for separate online discussions, or to generate community engagement directly at the sites of research papers or abstracts — something that has so far been lacking. Ultimately, the success of this worthy effort is incumbent on us all: so do visit and comment on your paper and others. Help the experiment to work. ■

Playful paradoxes

A half-century of Doctor Who *has shown the dramatic possibilities of science in the arts.*

November sees perhaps the most significant golden anniversary to have been celebrated anywhere or anywhen in the entirety of time and space. Yes — it will have been 50 years since the broadcast of the first episode of *Doctor Who*, the adventures of a character who has become television's most celebrated time traveller. On page 620 of this issue, cosmologist Andrew Jaffe looks at the facts and fictions of time travel as an enduring trope in fiction. As he notes, *Doctor Who*'s generally gleeful disregard of time-travel paradoxes is all for the good. There is a danger of taking such things much too seriously. What is more important is the story itself and the situations it offers its participants.

In other words, time travel might well be impossible in real life, but so what? Playing with its paradoxes is fun and inspires millions who might not otherwise have done so to consider its possibilities — dramatic, if not physical. There is, nonetheless, a valid point to be made: if time travel is unbelievable, isn't there a danger that readers or viewers cannot suspend disbelief for the duration? Well, yes, but if the writing is good enough, the audience can be carried along for the ride as long as it lasts, never questioning the reality of dragons or dilithium crystals, nor noting the delicious irony of a starship engineer in *Star Trek* who complains that "ye cannae change the laws of physics, Captain". This is why authors, artists and film-makers try their best to get right small details most likely to pull audiences up rather than worrying about the overarching conceit of (say) time travel. As zoologist Adam Summers recalled when he was brought in by Pixar to consult on their animation *Finding Nemo* (2003), artists pay great attention to detail to make their acts of world creation believable, even if fish don't actually talk (*Nature* **427,** 672–673; 2004).

Some authors, however, baulk at bringing unbelievable elements into their stories, especially if they see themselves as having regard for science. In the 1980 novel *Timescape*, real-life physicist Gregory Benford grants himself the allowance for information to be transmitted backwards through time, if not the transfer of people or machinery — a limitation that he exploits to perfection in the pay-off. People in a future world doomed by ecological catastrophe remain doomed, even though they transmit their warnings so that a past world can save itself.

Another staple of science fiction is the ability of spacecraft to travel enormous distances faster than the speed of light — something else that is almost certainly impossible. In a note to his 1986 novel *The Songs of Distant Earth*, the late Arthur C. Clarke writes that it "now seems almost certain that in the real universe we may never exceed the velocity of light. Even the very closest star systems will always be decades or centuries apart: no Warp Six will ever get you from one episode to another in time for next week's instalment. The great Producer in the Sky did not arrange his program planning that way." Clarke uses this limitation to poignant dramatic effect; not that it prevented him from exploiting such improbabilities as tapping vacuum energy or long-term suspended animation.

Perhaps the most surprising critic of such technological fixes was the great hobbitmonger himself, J. R. R. Tolkien, as revealed in his unfinished story *The Notion Club Papers* (published posthumously in 1992 in *Sauron Defeated*, edited by his son and literary executor Christopher Tolkien). Much of the story is a discussion between academics and writers on the dishonesty of using scientific-sounding MacGuffins to get one from here to there. If one insists on doing such a thing, one might as well dream oneself to Mars or wave a wizardly wand. The story centres on criticism of H. G. Wells's *The First Men in the Moon* (1901), in which the protagonist, one Dr Cavor, invents a material, cavorite, that provides insulation against gravity. "Gravity can't be treated like that," complains one of Tolkien's characters. "It's fundamental. It's a statement by the Universe of where you are in the Universe, and the Universe can't be tricked by a surname with *ite* stuck on the end, nor by any such abracadabra." Which suggests, perhaps surprisingly, that even if time travel and warp drives are impossible, the world's best-selling fantasy author knew a thing or two about the general theory of relativity. ■

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