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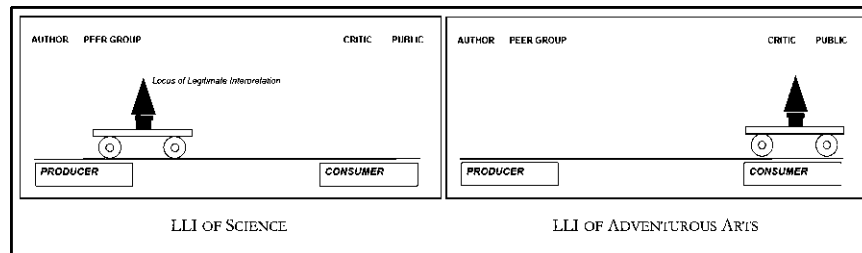
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THE OWLS: SOME DIFFICULTIES IN JUDGING
SCIENTIFIC CONSENSUS

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EDWARD Cheng’s arguments for abandoning the *Daubert* rule are entirely convincing. Sociologists think in terms of institutions as formed by their cultures: the law has one set of cultural expectations for the way decisions are made, science has a different set. Cheng has seen that where expert witnesses are concerned, scientific decisions are being made according to legal procedures, and it doesn’t work. Another way of putting it is that science and the law are defined, in part, by their “locus of legitimate interpretation” (LLI)—who is legitimately entitled to interpret what is going on in that cultural domain, the answer establishing the meaning of the knowledge-making culture. In science, the LLI is restricted to the producers of science, or people close to the producers; that community, for example, is where the peer reviewers are drawn from. Contrast this with the frontiers of fine art, where what counts is defined more by gallery owners and newspaper critics—people close to the consumers, not the producers.



In jury trials the LLI extends to the ordinary citizen. Cheng is describing what goes wrong when such an LLI is imposed on science.¹

Cheng’s solution is to shift from trying to establish the scientific facts using the procedures of the courtroom to establishing them using the institutions of science, and merely *reporting* the outcome to the court—“this is the scientific consensus on this matter.” We are always asking Plato’s question, “who guards the guardians?” and Cheng’s solution is a move in

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1. In the early days of the cultural revolution in the understanding of the nature of science, it was refreshing to realize that forensic science should not be done by an official body organized by the police but should have representatives from both defense and prosecution. But now we are seeing that we must go to something more neutral because the adversarial style of the courtroom likewise cannot give rise to good science.

the right direction. Refreshingly, it is a move away from the fashion, popular in various academic and political circles, to proclaim that the ultimate guardians should not be technical elites but “the people,” taken to be the source of a kind of magical collective wisdom even in technical matters. Legal juries usually work because their decisions are of the kind that ordinary citizens learn to make in their day-to-day lives, such as who can be trusted and who cannot—so no magic is involved, only “ubiquitous expertise.” Ubiquitous expertise is the deep expertise of the citizen in knowing how to speak their native language and live in their society—without ubiquitous expertise we’d all be strangers in our own country, and the typical jury draws on those abilities. But while scientific consensus is also formed through trust developed in face-to-face interaction, the expertise needed to take part in and understand the process is particular to the science in question and is developed among the specific core-group of scientists.² These core-groups are generally small and, where the science is difficult, they guard their boundaries jealously. From long experience I can tell you that one of the very hardest things you have to learn in becoming a member of a scientific core-set is learning how to trust and who to trust among those you encounter in the small group making the science.³

For good or ill, today we have before our eyes about as convincing a set of demonstrations as we could have, for the potential for the citizen’s ubiquitous expertise to fail, when we come to complicated technical matters such as vaccination. It is disappointing that certain colleagues in the sociology of science are determined to blame the science, or the institution of science, not the people, for this failure, sacrificing the chance to suppress some of the chaos that is leading democracy into populism.⁴ Cheng knows that the jury’s ubiquitous expertise is not going to be adequate when faced with deciding between competing scientific experts, even when supplemented by a judge who has mugged-up certain supposed rules and features of science developed when it was still believed that there

2. The concept of ubiquitous expertise is a feature of the “Periodic Table of Expertises” found in, for example, HARRY M. COLLINS & ROBERT EVANS, *RETHINKING EXPERTISE* 14 (2007). The need for trust in the formation of scientific knowledge has long been understood under the “second wave” of social studies of science. See H.M. Collins & Robert Evans, *The Third Wave of Science Studies: Studies of Expertise and Experience*, 32 *SOC. STUDS. SCI.* 235 (2002) (describing “three waves of science studies”). For particular instances of the complexities of developing trust in contemporary science, see H.M. Collins, *Tacit Knowledge, Trust, and the Q of Sapphire*, 31 *SOC. STUDS. SCI.* 71 (2001); HARRY M. COLLINS, *GRAVITY’S KISS: THE DETECTION OF GRAVITATIONAL WAVES* 322 (2017).

3. A “core-set” is the small set of scientists from whom consensus eventually emerges; core-sets may be riven by disagreement. “Core-groups” have excluded the major disagreements.

4. The “cultural turn” in the social study of science is easily absorbed into the chaos of beliefs that encourage the slogans underpinning populism and fascism. See Harry M. Collins, Robert Evans & Martin Weinel, *STS as Science or Politics?*, 47 *SOC. STUDS. SCI.* 580 (2017).

was a “formula” for science involving corroboration, or falsification, or some such philosophical touchstone.⁵

Unfortunately, Plato’s problem won’t be made to go away simply by turning to scientific consensus unless that consensus is already solidly formed. Where there are disputes, the substance of scientific consensus and the strength of the consensus can be hard to establish, and in both policy making and the courtroom, we need to know both substance and strength. Even though science is the best institution for reaching the best kind of consensus on matters scientific, it is far from perfect and still further from perfect when it comes to outsiders understanding what that consensus is. Let’s set out some of the reasons.

First, scientists come in various types. Many of them don’t understand how science works. One of the most famous scientists of all time pointed this out. Richard Feynman (is said to have) said, “The philosophy of science is as useful to scientists as ornithology is to birds.” What he meant is that scientists, like other skilled professionals, learn how to practice their skills without having to think about them first, and he was right. But it means that scientists are not always the best people to reflect on the nature of their skills, since there is no reason for them to do so; and it also means they are ripe subjects to absorb and retransmit all kinds of mythological versions of what they do. These myths are good for teaching science (and the textbooks are full of heroic stories about famous experiments and “Eureka events”), and teaching science this way does no harm until we have to think about how to apply science to policy, or how to apply it in the courtroom. Many scientists are powerful predators whose gaze is narrowly focused forward in pursuit of the next objective in their domain of truth. Scientists of that sort think that talking in terms of consensus is to take the easy way out: the driving ethos is that something is either true or it isn’t, and that view is an important component of scientific culture.⁶ We give the nickname “eagles” to such scientists. Sometimes, commitment to the truth, as they see it, can give rise to a tenacious “fringe science,” which no outsider could distinguish from the science itself in terms of the technical proficiency of its champions, but which lies outside the consensus and won’t go away.

5. Scientific truth-making is different to legal truth-making: scientific truth-making is long-term and continually open to revision; legal truth-making is limited by timetable and formal procedures. Legal advocacy also permits technical tricks in support of a client, whereas scientific truth-making has truth, not defense of a position, as its central value.

6. I embarked on a rather depressing series of emails with such a scientist whose views were not part of the consensus. I asked, I paraphrase, “though you may not believe ‘such and such,’ if asked, would you agree that it represents the mainstream view and your claims do not?” I could not get an answer outside of repeated explanations of why his views were right and the other views were wrong. But scientists could probably soon learn to understand what consensus means and learn to recognize it in others even when it conflicted with their own views.

Second, on the other hand, there are a few scientists, better thought of as “owls,” who are among the most brilliant understanders of the social subtleties of their profession: their ideas have helped to form the underpinnings of social studies of science. While deeply immersed in their scientific craft, owls are still able to turn their heads through 180 degrees and reflect upon the sociological and philosophical setting which comprises the scientific “air” they fly in. There is a complementary set of owls in the social studies of science, who start out by reflecting on the social “air” but work to understand the technical perspective of the scientific fields they study, so they, too, can look both ways.⁷ A suitable selection of owls from natural and social science, given the topic under consideration, could, we have suggested elsewhere, form a committee called “The Owls,” who could deliberate and give an answer to the substance and strength of consensus in domains of science to which their experience was a match. That could at least move us an asymptotic increment closer to resolving the *quis custodiet* problem where science and technology related policy is concerned. We have not had much take-up, but we still think there is something in it. The idea would, of course, be hard to apply within the timeframe of the courtroom where a dispute is serious and ongoing.

But we must not allow the perfect to drive out the good: moving in the direction of consensus has to be better than what we have now. One immediate benefit of thinking in terms of consensus is that the language is accessible, whereas any attempt to establish the scientific truth of the matter in a debate among lay-persons is derailed by the opacity of technical language—we are always going to be “blinded by science.” But the language of consensus is the language of everyday. For example, when we wanted a description for highly qualified scientists whose ideas were once important but are no longer taken seriously, even though they continue to cleave to their technical view, we chose a term from the supermarket—they are scientists who are “past their sell-by date”; when we wanted a description for highly qualified scientists corruptly inventing scientific doubt, we talked of “fake scientific controversies.” We cannot get away from the fact that you need some scientific *nous* to know who is whom, but at least you know what you are looking for.

Here are some more reasons why owls⁸ are needed for this kind of task:

- (1) Not all the technological expertise that has a legitimate place in a technological decision comes from qualified scientists: there are experience-based experts whose views should be *taken into account* even if they don’t coincide with the views of

7. The determined believers in the wisdom of the public in the domain of science and technology are the social science equivalent of eagles.

8. The idea of “The Owls” is first discussed (and at greater length in respect of technological policymaking) in HARRY M. COLLINS & ROBERT EVANS, *WHY DEMOCRACIES NEED SCIENCE* (2017).

the qualified experts. Owls are better than scientist-eagles at handling this uncomfortable reality without taking the idea to the extreme view that only citizens know when the scientific emperor has no clothes.

- (2) On the other hand, some of the views of the best qualified scientists should *not be taken into account* in forming the consensus because, as we have said, there are well-established and well qualified bodies of “fringe” scientists publishing papers in journals which are difficult to distinguish from mainstream journals unless you are an “insider.”⁹ An alien trying to learn terrestrial science from the literature would get it hopelessly wrong.¹⁰ A grasp of both the science and the social science of a domain are needed to sort out any particular case.

9. The *Daubert* criteria just would not apply here. For some sense of how practicing scientists and social scientists make the distinction between mainstream and fringe, see Harry Collins, *Rejecting Knowledge Claims Inside and Outside Science*, 44 SOC. STUDS. SCI. 722 (2014); Harry Collins, Andrew Bartlett & Luis Reyes-Galindo, *Demarcating Fringe Science for Policy*, 25 PERSPS. ON SCI. 411 (2017) (an earlier version promulgated as *The Ecology of Fringe Science and its Bearing on Policy* is available at <https://arxiv.org/abs/1606.05786> [<https://perma.cc/HX8B-LP6A>]).

10. Some contemporary consequences are well-described by James Heathers, *The Real Scandal About Ivermectin*, THE ATLANTIC (Oct. 23, 2021), <https://www.theatlantic.com/science/archive/2021/10/ivermectin-research-problems/620473/> [<https://perma.cc/CF8Y-D7MU>]. It has long been known that science works by ignoring most of the literature, including peer-reviewed publications, but Heathers points out the quarantine with respect to what insiders know they should ignore is violated at the time of a pandemic (quarantine is an apt metaphor), because of the explosion of social media discussion:

Much research is simply ignored by other scientists because it either looks “off” or is published in the wrong place. A huge gray literature exists in parallel to reliable clinical research, including work published in low-quality or outright predatory journals that will publish almost anything for money. Likewise, the authors of fabricated or heavily distorted papers tend to have modest ambitions: The point is to get their work in print and added to their CV, not to make waves. We often say these studies are designed to be “written but not read.” . . . In a pandemic, when the stakes are highest, the somewhat porous boundary between these publication worlds has all but disappeared. There is no gray literature now: Everything is a magnet for immediate attention and misunderstanding. An unbelievable, inaccurate study no longer has to linger in obscurity; it may bubble over into the public consciousness as soon as it appears online, and get passed around the internet like a lost kitten in a preschool. An instantly forgettable preprint, which would once have been read by only a few pedantic experts, can now be widely shared among hundreds of thousands on social media.

Id. (citing Jean Adams, Frances C. Hillier-Brown, Helen J. Moore, Amelia A. Lake, Vera Araujo-Soares, Martin White & Carolyn Summerbell, *Searching and Synthesising ‘Grey Literature’ and ‘Grey Information’ in Public Health: Critical Reflections on Three Case Studies*, SYSTEMIC REVS. (Sept. 29, 2016), <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-016-0337-y> [<https://perma.cc/7LEE-DDPZ>]).

- (3) There are a small number of corrupt scientists who publish contrarian papers so as to sow doubt, seemingly for financial reward, so as to create fake scientific controversies. There are other fake scientific controversies promulgated by scientists who are “past their sell-by” date but who can easily fool outsiders.¹¹ Scientific and social scientific understanding needs to contribute to picking these things apart.
- (4) There are entire “fake” sciences, or sciences that seem not to aim for goals that sciences would normally try to attain. For instance, in the legal setting it seems that fingerprint experts are reluctant to expose their skills to blind testing, though this would not be difficult—instead fingerprint identification continues to be used in the courtroom as more of a “tradition.” Under modern understandings of science, it could be argued that mainstream economics is not really a science because of the relative value it puts on maintaining what is ever more obviously a false model of human interaction, so it is no longer a search for truth, but it needs a secure understanding of science and social science to say so.

What all this means is that it is not going to be possible simply to switch the criterion to consensus within the current timetable and ethos of the courtroom. But there has to be a better solution than the current gear-grinding of science and the law. Cheng’s analysis must form the basis of the solution—one that moves the debate in the right direction. It is now a matter of working our way toward institutions that will enable this to work in the context of the courtroom.

11. See NAOMI ORESKES & ERIK M. CONWAY, *MERCHANTS OF DOUBT: HOW A HANDFUL OF SCIENTISTS OBSCURED THE TRUTH ON ISSUES FROM TOBACCO SMOKE TO GLOBAL WARMING* (2010) (discussing corrupt scientists); see also Collins & Evans, *supra* note 8 (discussing sell-by date and fake scientific controversies, initially based on Martin Weinel’s investigation of South African President Thabo Mbeki’s refusal to distribute anti-retroviral drugs to pregnant women).