

Scientific Testimony. By Mikkel Gerken. Oxford University Press, 2022. Pp. 320. GBP 65. ISBN 9780198857273.

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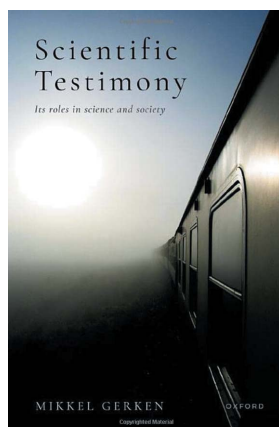
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This book analyses the variety of audiences that a scientist communicates with about their work and findings. It is a book of formal, clearly precise, language, but not impenetrably so. Occasionally the author relaxes into jargon. So, in Chapter 1 we learn for example of the scientist who has a ‘side hustle’ when giving scientific expert testimony but also doing some science reporting on the side. Chapter 1 is entitled *Testimony and the scientific enterprise*. Fig. 1.1 is a helpful flow diagram of types of testimony. As well as types of audience, the author also carefully specifies the types of communicator. So we have the scientist who is expert in a topic and a science correspondent from the media who does their best to communicate a new result on behalf of the scientists involved. The science correspondent may ‘trade accessibility and novelty versus accuracy and reliability’. The author sums up his approach as follows: ‘to mainly consider cases in which the expert is both objectively highly reliable and comparatively more reliable than laypersons since this is highly relevant to scientific expert testimony’. An interesting aspect of testimony is introduced in Section 1.3.c. ‘Given that the epistemic force of science partly derives from collaboration among hyper-specialized scientists, communication between them is paramount.’ I did not previously regard such communication as testimony, but, of course, it is. A marker is also put down about ‘How should scientists disseminate their research to the public?’.

Chapter 2 is entitled *The nature of testimony*. This chapter develops a logic for a knowledgeable speaker and a receptive but unknowledgeable audience. That is, the latter, when inexperienced, has to accept as warranted what an expert imparts. During this chapter I recalled that in a courtroom an expert witness is cross examined both by the prosecution and by the defence lawyers. So the jury, as audience, if not gaining expertise nevertheless develops a confidence or not in an expert’s testimony. Such an example could have provided an anchor for this chapter which I found missing. Instead an, to me, absurd situation is portrayed of ‘two twins aged four, one being in an environment where speakers testify sincerely and only when warranted versus the other twin who is in an environment where speakers lie when they can get away with it and are vague when they can’t.’ Anyway, to be as fair as possible, the author’s example shows the importance of the social environment for testimony given and whether it is believed or not. We also learn of the pros and cons of the Acceptance Principle, which looks fine to me, that ‘A person is entitled to accept as true something that is presented as true and that is intelligible to him, unless there are stronger reasons not to do so’ (Burge, 1993). A style of the author seems to be to suddenly introduce a key sentence such as ‘For example, the standard of epistemic norms is truth.’

Part II of the book is entitled *Scientific testimony within science*. Chapter 3 is entitled *Scientific justification as the basis of scientific testimony*. Amongst a complex description of justification as a characterizer of science, rather than content (so as to define a boundary from, and its epistemological superiority to, pseudoscience), there are points such as ‘science serves other masters than truth. These include practical factors such as relevance or urgency or professional ones such as publishability or visibility.’ I find this a cynical viewpoint. It is possible to serve truth and those other factors, e.g. by publishing individual steps, albeit then possibly being accused of slicing the findings too thinly. Going back to the definition of ‘scientific justification’, the author’s practical example is illuminating: so ‘the International Panel on Climate Change reports grade the scientific justification for the relevant hypotheses (to climate change)’. Another hallmark of



science, the author argues, is that a scientist can articulate details of, and answer questions on, the science being presented. The chapter concludes with a cogent and concise summary which I found helpful.

Chapter 4 is entitled *Intra-scientific testimony*. The chapter opens via the theme of types of collaboration, certainly an important topic and a situation where one has to trust one's collaborators. I was expecting, as a perhaps better place to start, a discussion of specialist science journals as would be read within one discipline versus journals such as *Nature* or *Science* where one attempts to learn about the (perceived) most impactful work not only within one's own discipline but also well beyond it. In the section *Warrant-assertive speech act* we learn that 'For example, it is reasonable to criticize an asserter who asserts something of extreme importance on the basis of very poor warrant in a non-urgent context where she (he) could have easily obtained further evidence.' Well yes, how very true. Oddly, however, the author then makes the point that 'it is possible for the norms of assertion to be met whereas the standards of truthfulness need not.' The chapter details a variety of situations of intra-scientific testimony and generalizes these in logical formalisms. The formal vocabulary and terminology that I mentioned at the start of this book review I found increasingly difficult in this chapter. The practical examples he gives I found helpful though.

Part III of the book is entitled *Scientific testimony in society*. In this part the author explains that he will distinguish between scientific testimony and science reporting. Chapter 5 is entitled *Public Scientific Testimony I* with a sub-title *Scientific expert testimony*. A surprising inclusion to my mind is a section on 'scientific expert testimony in a domain of epistemic expertise other than the scientist's own', not least as the author declares an essential feature that 'truth is central to the aims of scientific expert testimony'. As he points out, though, the best available scientifically justified testimony may be false. Next, in considering an audience, it may be that members of the public in it have a bias against the scientific explanations presented. Then, in a neat twist the author points out that, against Popper's falsification principle, a scientist may themselves have a bias in favour of their hypothesis. As interesting case studies the author describes the phenomenon of sections of the public not believing in climate change, whilst happy to trust a weather forecast, and people against vaccination but still willing to visit a doctor for other treatments. Such contradictions have led to studies about public consumption of science, and how best to communicate science (see *e.g.* <https://www.nationalacademies.org/our-work/standing-committee-on-advancing-science-communication-research-and-practice>). A very troubling assertion is that whilst a scientist thinks that 'don't take my word for it' means attaching all underpinning data to a publication's narrative a science sceptic would interpret it instead as an invitation to repeat the experiment oneself, even if unqualified to do it properly. This chapter interestingly introduces the idea that scientists may exaggerate so as to garner more visibility with the public and perhaps funding agencies. In my book *Skills for a scientific life* (Helliwell, 2017) I also mentioned this in the case of pre-

ture press releases. The author proposes as an antidote to scientists' overselling a norm which he calls justification expert testimony (JET). If the scientist cannot justify a statement then it should not be said. I recall the lack of a scientist's hippocratic oath like that of the medic: a 'do no harm' principle and practice. That would be a better norm than a new one, like JET, in my view.

Chapter 6 is entitled *Public scientific testimony II: Science reporting*. This focuses on 'science reporting by journalists, who are not typically experts themselves'. This as written seems to me an unfair judgement on professional science correspondents who take care to ensure that the details are correct. The chapter motors into obviously a wide literature on the topic where different theories of science reporting are described: an information deficit (I take this to mean newsworthy), consensus-amongst-scientists reporting (report when scientists agree on a topic) and values-targeted reporting (a 'how to' guide of reporting when faced with *e.g.* an audience of climate change deniers). The author puts forward his preference, which, again, is scientific-justification-based reporting. This is tethered to justification (or lack of justification) of a hypothesis. This is fine for a topic that has one or more hypotheses behind explaining a phenomenon. However, I have argued before that that is not the only scientific method. The chapter concludes with a sparkling discussion of an issue of our times, 'balanced reporting' versus 'reliable reporting': a clear illustration of which would be, if a TV channel debated 'Is the Earth round or flat?' then should it be essential, for balance, that a flat-earther be invited to the debate? Obviously not. Then there is the practical question for TV channels when discussing climate change evidence: should there be two invitees or ten, or even a hundred, for presenting climate change evidence and only one for a climate change scepticism presentation?

Part IV is entitled *Scientific testimony in science and society*. Chapter 7 is entitled *The significance of science testimony*. The author opens by reminding us of the contrast between The Royal Society's 'slogan' *Nullius in verba* and his own 'Scientific testimony is the mortar of the scientific edifice'. The chapter has a lengthy rediscussion of intra-scientific collaboration and testimony therein. This seems a mismatch to the title for Part IV, *i.e.* with a promised emphasis on science and society. An especially interesting statement nevertheless is 'scientific objectivity requires critical examination by the wider scientific community'. This seems to me a statement of the need for consensus by the author and opposes the idea, which I prefer, that a single study underpinned by all its data (raw, processed and derived) can be objective. Section 7.3 is entitled *Public scientific testimony in society*. Presumably this title excludes cases such as being quizzed privately, as a scientist, on a topic by, say, one's tennis partner. Indeed, I have found that for especially interesting topics (*e.g.* is the future of electricity supply nuclear or wind or tidal, or all manner of combinations?) then it is not only a single tennis partner that will be interested, but all my tennis partners at our annual dinner. These encounters are potentially very influential. Anyway, leaving aside the chapter title, the chapter dissects

numerous situations of the importance to society of scientific testimony and also of helping garner future investment by society in science. An interesting division is made between science before testimony and examples such as citizen science intertwining public involvement in the process of a science study and simultaneously providing scientific testimony to that public. In bringing the book to a conclusion the author makes the point that there is no one simple single conclusion. That said, it looms large for me that he rejects the principle of ‘don’t take my word for it’ (*nullius in verba*), i.e. science before testimony, and I stress that it is vital to have the underpinning data of a study to support the narrative of a publication. Without that then experts in the discipline cannot form a consensus or critique of a study through reproducing it. As the US National Academies of Sciences, Engineering, and Medicine (2019) report emphasized, if a study is reproducible others can attempt a replication. I admit that that then puts the public in the position of listening to the scientific testimony of experts rather than taking part in the science process, a wished for scenario of the author.

Finally there is a Coda (a final embellishment) entitled *Scientific testimony, cognitive diversity and epistemic injustice*. I found this opaque in its terminology and therefore assume that it must be aimed at specialists. Anyway, it added no final embellishment for me.

There follows an appendix entitled *List of principles*. This has the caveat that ‘some of the enlisted principles are contradictory, and that the author does not endorse them all’. The ones that are not endorsed are not so labelled in this appendix. There is an extensive list of references, usefully with titles, some of which are for a general reader. There follows an authors’ index and finally a subject index.

Overall, I think this book is predominantly for specialists of philosophy of science and, even there, within a sub-domain of analysts of *scientific communication done properly*. The book

defines properly, my word, the numerous communication situations faced by the scientist. That said, speaking as a non-specialist (a practising scientist), I found it worthwhile to persevere with its complex terminology and formal logic. It has made me more aware of the types of audience I am communicating with. Previously, whilst mainly following ‘common sense’ when in front of the media, I have been preoccupied with *when* it is timely to communicate research findings and making things as simple as possible without compromising facts. Also, like the medics, the dictum ‘do no harm’ is one of my common sense principles. Even so, if one is unexpectedly asked at the end of an interview about ‘divisive issues’, as the author labels them (climate change is frequently mentioned as such in the book), then ‘science denialism’ may well lurk in the audience. In such a case, another of my common sense principles is that one’s answer should be extra careful and evidence based, especially where to decline to answer such a question may open the door to a misinterpretation. Throughout the book, the author declares that when ever discussing the public and society he is focusing on deliberative democracies (there are 78 mentions of this), a term that was not exactly familiar to me and which I looked up here: https://en.wikipedia.org/wiki/Deliberative_democracy. To conclude, this book is clearly a work of devoted and meticulous scholarship from which I learnt a lot, despite disagreeing with some aspects of it.

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