brought together. To what extent members of the different communities interacted at the symposium is not evident from these proceedings: there is no record of discussion (just a 'Q&A' embedded in one of the contributions) nor a conference summary.

The very diverse strands are, however, brought together in a comprehensive, magisterial survey by Stan Owocki of the physical processes driving the outflows from stars and planets — ranging from the CAK formalism of the line-driven winds of massive stars, through the solar corona and wind, spin-down, planetary winds and mass loss, followed by a discussion of magnetospheres of stars and planets. The proceedings continue with a section on observational evidence for winds, led by reviews on low-mass stars, high-mass stars, and planets. Unlike high-mass stars, where there is an abundance of mass-loss diagnostics, the greatly smaller mass-loss rates of lower-mass stars and planets restricts possible observables, primarily to the Lyman- α line profile, observable only from space and much impacted by interstellar absorption, or the weaker but more easily observable 10830-Å He I line. These reviews are accompanied by a number of shorter papers on individual objects or topics. The following section entitled 'Ingredients of Winds' again leads with reviews covering the three subject areas complementing and often expanding on material presented earlier. I am acquainted with only one of the subject areas but found all these reviews to be informative and well referenced. The lead review in the fourth part of the Proceedings, 'Flow-Flow Interactions', considers interaction of stellar winds with the ISM — but a colliding-wind system is the subject of one of the short contributions. The fifth part considering the relevance of winds contains mainly shorter papers touching on a variety of topics.

The production of the proceedings is mostly acceptable, but the editing could have been tighter. There is a problem with the diagrams. Many of them were produced in colour, which are referred to in the captions, but these are not always discernable on the printed page. This is not a new problem. Many of us have used colour for the on-line versions of our papers but taken care to choose symbols and line styles so that the figures would also be useful to the reader of the monochrome printed page. The authors should have been encouraged to do the same: although colours can be seen on the on-line version or preprints, it is the printed volume that is being reviewed here. Conference proceedings containing reviews and short communications giving a snapshot of current work are often suggested as a good means for beginners to get started in a new field; the present volume gives entry to three. — PEREDUR WILLIAMS.

The Philosophy and Practice of Science, by David B. Teplow (Cambridge University Press), 2023. Pp. 391, 25 × 18 cm. Price £54·99/\$69·99 (hardbound; ISBN 978 1 107 04430 2).

In 1931, the UK government first published the now familiar *Highway Code*, an advisory booklet which formalized the system of road users' signals and behaviours that had evolved through the increased use and popularity of all varieties of road transport in the early decades of the century. Four years later (1935) a compulsory practical test for drivers of motor vehicles was introduced. Sixty-one years later (1996), a theory test as precursor to the practical test, and based to a large extent on the *Highway Code*, was also made compulsory.

I mention this history because as I read the current tome, for it surely does meet the essentials in the definition of that word with 770 references and 752 footnotes, I was fleetingly, but all too often, drawn to the analogy with UK road users and their regulation. All analogies are imperfect, but as this work

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discusses the Philosophy (Highway Code?) and Research Practice in science (actions of all road users?) it may not be a totally inappropriate one. Few research scientists as eminent as Teplow have ventured into what might be considered the dangerously choppy waters in which philosophers of science like to sail. As a result, I wonder if the philosophizers have all too often been looked upon as 'meddlesome priests' in the hard-nosed world where real work is being done. As Dylan wrote, "You don't need a weatherman to know which way the wind blows." Or do you?

In this respect, the current text is a comprehensive, informative, and sympathetic introduction to the view from both sides ('nowhere' might philosophically be more appropriate!) and as such is to be lauded as an exceptional and welcome act of diplomacy. It begins with discussion of such philosophical fundamentals as, what is science?, what is a fact?, what is knowledge?, what is truth? There follows a substantial treatise on the evolution of the so-called Scientific Method, with a timeline covering no fewer than five millennia and featuring no fewer than twenty six 'influencers'. Not until late on in the timeline, in the 16th Century, did many of the names become familiar to me and, unrepresentative as they might be, my highlights were firstly noting Robert Boyle's (1627-1691) ten rules of good scientific writing (all of which, as Teplow notes, remain entirely relevant today) and particularly in wondering if his eighth item presaged the practice of meta-analysis, a technique only relatively recently in vogue. The other highlight was the final entry, that of Paul Feyeraband (1924–1994) — jester, savant or, in modern parlance, just an archetypal disruptor? After a full seventy-six pages of carefully catalogued, albeit not entirely linear, 'progress' to distil the essence of the, or perhaps more realistically, *multiple* Scientific Methods, for the final entry to be a philosopher who proposes that there is no such thing and that in science practice anything goes, or should go, in an anarchistic maelstrom, cannot fail but raise a smile. Needless to say this is not where Teplow leaves the discussion and the nuanced position of horses for courses (Methods for Disciplines) is well made.

The middle section of the book (160 pages) is devoted to an exposition of 'Science in Practice'. This ranges from guidelines for the initial selection of research topics, *via* the development of theories and their testing (verification, falsification, or even the possibility that neither is possible) through to the more philosophical aspects of knowledge and understanding, if indeed any at all are claimed to result from the research. In the later sections, detailed practical issues such as statistical significance are discussed (unshakeable believers in p < 0.05 beware!) and although the 'c' word is vastly overused these days, the 'Replicability Crisis' comes under appropriate scrutiny.

The somewhat shorter final chapter (40 pages) discusses 'Science as a Social Endeavor'. Despite its relative brevity, it shines a focussed light on many hard questions and home truths, some of which, inevitably, are not easily reconciled. How does one guard against future Replicability Crises when the ethos of "no one remembers who is second" prevails? Can scientific research always be immune to non-epistemic values and be the value-free ideal that many wish it to be, or, more dangerously, assume it is? Indeed, in some circumstances would such immunity even be desirable? Another example, too recent for inclusion in this book, which would be ripe for discussion in this context is how the scientific community should in future avoid, or vigorously respond to, the reported "extremely productive author" phenomenon¹. In the age of ubiquitous AI, these questions and others surely have an extra special relevance and urgency.

Beyond the attention of the two main participants in this saga (philosophers,

researchers) this last chapter is the one that should be thrust into the public gaze. With public trust in science on a knife edge in some disciplines, these are important concepts and tensions to be appreciated. Airing them more widely might help bridge the sometimes barren chasms between those sceptical of all received scientific wisdom, the unthinking 'follow the science' herd, and those in danger of infection by scientism.

Overall the book is a dense, encyclopaedic *tour de force*, which cannot be taken or read lightly. I assume it is aimed primarily at those starting out on a research career, although as a refresher for the longer-in-tooth it will contain some surprises and even more sobering reminders. For anyone willing to invest the time and effort, it is hard to see anything but significant reward resulting.

But what of the nagging road-user analogy? The UK government's Road Traffic Act (1988) Section 38 contains the following paragraph: "A failure on the part of a person to observe a provision of *The Highway Code* shall not of itself render that person liable to criminal proceedings of any kind but any such failure may in any proceedings (whether civil or criminal...) be relied upon by any party to the proceedings as tending to establish or negative any liability which is in question in those proceedings."

Although it would no doubt be a policy in danger of being labelled as draconian, what if nascent researchers were required to pass a formal 'theory test' on their knowledge and understanding (whatever those two are!) of the concepts, both philosophical and practical, presented in this text before setting out on the practicalities of post-graduate research? Their subsequent thesis and its defence would represent the final 'practical driving test', cognisant of the principles already imbued by the theory test. From a quick trawl of the internet and personal contacts, it seems that some training akin to a theory test is indeed already offered in the UK, but it appears to be sporadic and very much a minority sport at the moment. However, without such a scheme one might wonder if the awarding of the degree of Doctor of Philosophy is bordering ironic and acceptable merely as an innocent, quirky anachronism, somewhat akin to the persistent titles of some of the awards in the UK's honours system. Teplow's teaching at UCLA of courses featuring this book's material promises to be an educational green shoot heading in the right direction. Hopefully it will not be another 61 years before others catch up! — DAVE PIKE.

Reference

- John P. A. Ioannidis, Thomas A. Collins, & Jeroen Baas, 2023.bio Rxiv https://doi.org/10.1101/2023.11.23.568476
- White Holes: Inside the Horizon, by Carlo Rovelli (Allen Lane), 2023. Pp. 157, 19^{.8} × 11^{.8} cm. Price £14[.]99/\$19[.]49 (hardbound; ISBN 978 0 241 62897 3).

This book is a quick read, not only because of the small format (and not all that many pages), but because, like Rovelli's other books, it is very well written (more precisely, I can judge only the translation, by Simon Carnell, at least as far as the language goes; like his other popular-science books, the original is in Italian). Rovelli, an active researcher in the field of loop quantum gravity, has written several popular books, and even landed a bestseller¹ (reviewed in these pages²). Like many of his other popular-science books, it is a mixture of standard knowledge and his own work. The table of contents lists only the three parts, though each has five or six chapters.