

Editorial: The unreasonable effectiveness of mathematics

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This issue has been produced during the pandemic. Although it is mainly a record of the Four Academies Forum, of last November, it also contains other papers — not least a timely paper by Graham Bell FRSN outlining a test for changes in taste (and smell) that might be evidence of infection by COVID-19. This test, although not definitive, can be performed at home, and might lead to further, more rigorous testing for any possible infection.¹

In late June², the Society held its Annual Dinner, via Zoom. Four of us gathered chez moi to have dinner and watch proceedings. Brian Schmidt DistFRSN, introduced by the Governor, our Patron, Margaret Beazley, spoke on “Evidence and education in a post-truth and post-COVID world.” The Governor’s learned introduction, followed by Professor Schmidt’s address, are both published here.

There is also a paper by David Hush FRSN, presented on the occasion of the world premiere performance, on 27 February 2020 at the Sydney Mechanics’ School of Arts, of his Partita for Solo Violin, in the tradition of J. S. Bach and others. This piece was commissioned by the Royal Society, a first. As well as a discussion of the history of solo sonatas for violin, the paper includes hyper-text links to recordings of this performance by Anna Da Silva Chen, as well as a

performance by her on the same occasion of Bach’s Solo Violin Partita No. 1 in G minor BWV 1001. This is a departure for the *Journal*, although not the first article on music.³

Although memories of the smoke and haze have faded with winter and the pandemic, the fires last summer were horrific, lasting almost six months on the back of a fierce drought.⁴ I was aware of Stephen J. Pyne, at Arizona State University, the doyen of writers on bushfires and wild fires. He has written several books on such fires in the U.S., Australia and elsewhere.⁵ In particular, thirty years ago he wrote a book specifically on the history of bushfires in Australia, *Burning Bush* (1991). I had the idea of approaching him to commission a paper which might build on the 1991 book, in the light of last summer’s fires. He was very receptive to my invitation, being on the point of publishing an op-ed piece on the topic in the *Guardian*.⁶ More of a reflection on past and future fires, the paper here introduces the notion of the Pyrocene era,

1 Graham tells me that a pre-pub version of the paper has led to an invitation from the Japanese Association for Smell and Taste Science (JASTS) for their virtual conference in October.

2 June 27th, the 199th birthday of the Society.

3 See, for instance, David Hush. [Reflections on Mozart](#). *Journal & Proceedings of the Royal Society of New South Wales* 151: 209–212, 2018.

4 A weekend house of mine in the Blue Mountains was utterly destroyed four days before Christmas. The ashes of Olivia Newton-John’s father, Brinley (1914–1992), are (still) buried on the property.

5 Sadly, my copies were incinerated last December. It’s Kindle from now on for me.

6 Stephen J. Pyne, “The Australian fires are a harbinger of things to come. Don’t ignore their warning,” *The Guardian*, 7 January 2020. <https://www.theguardian.com/commentisfree/2020/jan/07/australia-fires-warning>

affecting not just Australia (although especially affecting Australia) but also California, the Mediterranean, to begin with, and then, one by one, increasingly flammable regions across the globe. Incidentally, I was not alone in thinking of Steve Pyne: an old friend of mine, Henry Rosenbloom, publisher of Scribe Books in Melbourne, also approached him. The result of some hard work across the Pacific is *The Still-Burning Bush* (2020).

Another departure for the *Journal* was the last issue, Volume 152, Number 3, March 2020. This venture, between the Royal Society and the Australian and New Zealand Associations of von Humboldt Fellows, includes papers from their 2019 Biennial Symposium at Macquarie University. David Black FRSN was the mid-wife to the venture. It is on-line only. Given the topic of the 2017 Forum⁷ and Brian Schmidt's address here, of special interest is the piece by Dietmar Höttecke.⁸

Sadly, one of our Distinguished Fellows, Lord Robert May of Oxford, died earlier this year. Len Fisher FRSN, his old friend, has written an obituary. Lord May's prolific work in physics, biology, and ecology included a development that is very timely during the pandemic: he and co-authors derived the reproductive ratio for pandemics (an indication of the speed of spread of the infection), which we have heard much about recently. As the obituary notes, the May-Wigner theorem derives from theoretical work of May's

on the counter-intuitive lack of stability of large complex eco-systems; Eugene Wigner (1902–1995) had proved this for systems in physics. But Wigner (1960) had remarked on the “unreasonable effectiveness of mathematics” in the natural sciences: “The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve.” Bob May was one of the first to show that mathematics also serves this role in the biological and ecological sciences.

As for the Forum, it has stood out for me as demanding the most work of any of the four Forums I've edited. Of the sixteen presentations on the day, over six months later I have received only eight final papers. Yes, the corona virus has disrupted work patterns, but none of the recalcitrants mentioned the pandemic as a reason for their lack of response, if indeed they gave any. Since I see the *Journal* as a publication of record of the Society's activities, I here publish lightly edited the transcripts of the eight presentations, the papers for which are missing in action. The other eight papers are present.

There have been some changes to the Editorial Board. Following the appointment of Len Fisher FRSN last year, this year Jessica Milner Davis FRSN has joined the Board, and we thank the departing Michael Lake for long service to the *Journal*, first as Editor, and then as Editorial Board member, for over twelve years. Thank you to Jason Antony, as always. I also thank John Spence FRS for the epigraph from Eugene Wigner that began this editorial.

7 “The Future of Reason in a Post-Truth World,” *Journal & Proceedings of the Royal Society of New South Wales* 151: 22–105, 2018.

8 Dietmar Höttecke, [Understanding science and how it works in the age of social media](#), *Journal & Proceedings of the Royal Society of New South Wales* 152: 307–319, 2020.

References

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Wigner E. (1960) “The unreasonable effectiveness of mathematics in the natural sciences,” *Communications in Pure and Applied Mathematics*, 13 (1): 1–14 (February). <http://www.dartmouth.edu/~matc/MathDrama/reading/Wigner.html>

