

and incentives is revealed. To get jobs, promotions, grants or fame, a scientist must publish in high-visibility journals. That is not straightforward. It is not enough to invent an experiment; design, run, and analyse it flawlessly; and write a paper that describes the results clearly. What's also needed are beautiful data that tell an unblemished, consistent story in support of the hypothesis. No amount of care or cleverness can guarantee such results.

Even honest researchers may consciously or unconsciously engage in lesser sins to get better-looking (rather than better) results. They might use biased reasoning and hidden flexibility in deciding how to collect (or not) more data, in reporting (or not) all measures and findings, and in modifying their hypotheses to fit the data. Such decisions might be good for scientists in the short run. They are not good for science.

Chambers is a fan of preregistration as a corrective. With this, scientists describe a proposed study in detail, submit it to a journal for review and potentially get an 'in-principle acceptance'. After running the study and making the data publicly available, a manuscript that fulfils the proposal will be published — regardless of how the data turn out. This could help reduce many of the sins, such as bias, flexibility and some fraud; file drawers filled with studies that 'don't work'; and bean counting, or evaluations concerned with numbers (such as quantity of publications) rather than quality.

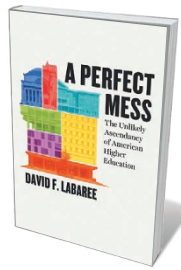
Preregistration can't ameliorate all sins, but Chambers provides examples of concrete steps that can be taken by a variety of stakeholders: be more aware of potential biases; share methods and data; push for and reward transparency and openness.

This book is written for anyone curious about how science might repair itself. It should be required reading in university courses on research methods. And it's for publishers, grant funders, journalists and science writers. Enabling, creating and disseminating good science is a vast cooperative endeavour.

Is there still a crisis? Certainly more research will be found to be unreplicable and more theories will unravel. Yet it's key to recall that 'crisis mode' in an epidemic can dissipate as successful treatments evolve, even when new cases arise. As Chambers shows, we think we know the causes and can abate much of the problem. Crisis phase over (in my view). But there is still much work to be done. ■

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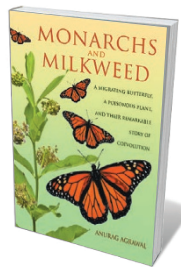
Books in brief



A Perfect Mess: The Unlikely Ascendancy of American Higher Education

David F. Labaree UNIVERSITY OF CHICAGO PRESS (2017)

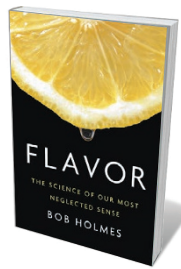
How did a ragbag of colleges become a towering assemblage of world-class universities? In this deft history, David Labaree tracks the evolution of the US higher-education system, an unwieldy array that nevertheless produced 40% of Nobel laureates between 1901 and 2013. US economic ascendancy, the rise of English as a lingua franca and postwar research funding all played a part; but the fulcrum was the autonomy and strangely effective “anarchic complexity” of the system itself. As Labaree asks, “Why ruin a perfect mess?”



Monarchs and Milkweed

Anurag Agrawal PRINCETON UNIVERSITY PRESS (2017)

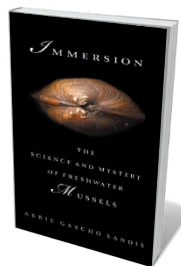
From its tigerish beauty and epic 5,000-kilometre migration to its evolutionary arms race with the toxic milkweed plant, North America's monarch butterfly (*Danaus plexippus*) is a scientific superstar. Ecologist Anurag Agrawal's in-depth study draws on his own research and that of pioneers such as Lincoln Brower to elucidate plant, insect and their evolving defence and counter-defence. His analysis of the monarch's severe decline is nuanced, suggesting that dwindling nectar sources and deforestation in overwintering sites may be culprits, along with milkweed loss.



Flavour: The Science of Our Most Neglected Sense

Bob Holmes W. W. NORTON (2017)

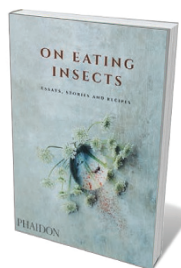
If you can't distinguish a Fuji apple from a Gala on taste alone, join the crowd. As Bob Holmes notes, most of us waft through life barely cognizant of the sensory riches concocted by nose, tongue and mouth. Mining the boom in the science of flavour, Holmes reveals how it takes a “committee” of lingual receptors to taste bitterness; is stumped by a smell halfway between Cheddar cheese and turpentine in an olfaction test; and ponders why chewing a Sichuan peppercorn seems to set off a 50-hertz vibration in his mouth. A prodigious and delectable feast of accessible science.



Immersion: The Science and Mystery of Freshwater Mussels

Abbie Gascho Landis ISLAND (2017)

Heelsplitter, shineyrayed pocketbook, fatmucket: to inspire such monikers, the freshwater mussels of the US southeast must be charismatic indeed. And so it proves in veterinary surgeon and writer Abbie Gascho Landis's eloquent treatise. She snorkelled through creeks and packed in lab time to study the water-filtering bivalves and their intriguing behaviours — such as bundling their larvae into minnow-shaped lures to hitch rides on hungry fish. Yet with 70% of 300 species imperilled and US waterways under pressure, Landis's book is as much call to action as paean to mesmerizing molluscs.



On Eating Insects: Essays, Stories and Recipes

Josh Evans, Roberto Flore, Michael Bom Frøst and Nordic Food Lab PHAIDON (2017)

Sometimes, only spicy cricket and asparagus (with lacto-fermented pea water) will do — if, that is, you snack on the wild side. This big, beautifully illustrated compendium on entomophagy by food researchers Josh Evans, Roberto Flore and Michael Bom Frøst (with the experimental Nordic Food Lab) offers techniques and tasting notes gleaned from global fieldwork, and tongue-boggling recipes. A gem for the curious, or anyone craving an ant-larvae taco. [Barbara Kiser](#)