The Index seems rather inadequate, because many terms mentioned in the text, such as Green's formula, do not have entries. Indeed, entries corresponding to several leading letters have only single entries—for example, 'Exterior point' is the only entry for E. The book does not compare well with many of the items in its Bibliography.

Reference

1. J. L. Walsh, History of the Riemann Mapping Theorem, *Amer. Math. Monthly* **80** (1973) pp. 270-276

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The best writing on mathematics 2021 by Mircea Pitici (ed.), pp. 288, £20.00, ISBN 978-0-691-22570-8, Princeton University Press (2022)

Readers of *The Mathematical Gazette* will be pleased to see Mike Askew's 2020 Presidential Address in this 'compendium of good mathematical writing'. It is a plea for raising the profile of reasoning, rather than procedural competence, in mathematics education. In his exposition, Askew explores what he calls 'the language of mathematical reasoning', distinguishing between types such as deductive, inductive, abductive (if you want to know what than means you will need to read the article), analogical and relational. While this appeal is very welcome, it is rather a pity that it is necessary, and I get the impression that it would be taken for granted in mathematical education in many countries outside the UK.

Roger Howe's essay on 'knowing and teaching elementary mathematics' covers similar ground, comparing the mathematical understanding of US and Chinese teachers. He concludes that his own country has a good way to go before it can even compete with its rival. Even at the elementary level, most of the Chinese teachers are specialists who can concentrate on their subject and spend significant time outside the classroom working with individual students and sharing ideas with their colleagues. This is underscored by comparing the PISA results in the two countries.

Moving from school to university, there are some thought-provoking essays on how to organise research. Stephan Garcia compiles a list of 24 recommendations for academic supervisors, ranging from 'Pivot when returns diminish' to 'Turn lemons into lemonade'. A short but piquant essay by Melvyn Nathanson asks if you can 'own' a mathematical truth, and thereby prevent others from using it in their own research, even with acknowledgment, before they have published it. Terence Tao confesses to almost flunking an exam at Princeton by inadequate revision of the topics which he had chosen. This, apparently, is a significant source of comfort to the more recent graduate students at the college.

The earlier section of the compendium contains the usual assortment of interesting topics, many of which explore the relevance of mathematics to other disciplines, and in particular architecture and design. There is a fascinating discussion by Michael Duddy which focuses on the clash between logic, intellect and truth on the one side and intuition, feeling and beauty on the other. Specifically, he surveys the work of Palladio in Renaissance Florence which necessitates compromises when 'turning the corner' of an Ionic portico. A related article by Steve Pomerantz explores the work of the Cosmati family of marble workers in Rome who produced intricate non-regular tilings of hexagons, triangles and rhombi.

There is never time to mention everything in this series of compilations, so I will finish by mentioning a number of puzzles. John Conway and others pose ‘a headache-causing problem’ in game theory. Stan Wagon asks what direction will a stationary bicycle move if you pull back the pedal, and in what direction does the lower pedal move relative to the floor. Jacob Siehler discusses conditions under which it is possible to tricolour a pyramid of hexagonal cells, under certain rules.

The inclusion of Mike Askew's address made me wonder how often Mircea Pitici has managed to include something from the journal in his compendia. The answer is that only one article, that by John Conway and Alex Ryba in 2015, has made it into the selection. There is also a list of material which was considered by the Editor not chosen, and again the *Gazette* is, I think, under-represented, with only two mentions. Obviously the focus in this publication is going to be on the USA, but I cannot help thinking that there is plenty of excellent material in our journal which is never considered.

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What's the use? by Ian Stewart, pp 336, £20 (hard), ISBN 978-1-54169-949-6, Basic Books (2021)

Thinking better: the art of the shortcut in math and life by Marcus du Sautoy, pp 336, £20, ISBN 978-1-54160-036-2, Basic Books (2021)

Both of these books appear to belong in the category of maths for the general reader, by established and well-known authors in this field, which is why I decided to read both together. I did this for the first few chapters of each, at which point it became clear that they had very different flavours.

The theme of Stewart's book is Eugene Wigner's famous comments about “the unreasonable effectiveness of mathematics in the natural sciences”, though the book widens the scope far beyond the natural sciences. Stewart's distinction between reasonable and unreasonable is that it is no surprise that the equations of aerodynamics are useful in aircraft design, precisely because the equations were developed with air flow over obstacles in mind. So this spin-off is entirely reasonable. By contrast think of graph theory, invented in the eighteenth century as a clever way of solving a little recreational puzzle, but in later centuries (including the present one) finding totally unexpected applications to a wide range of topics, some of which did not exist when graph theory was invented. It is in this sense that Stewart uses ‘unreasonable’. He concentrates on how mathematics can lead us far outside anything we may have associated with it.

Du Sautoy on the other hand concentrates more directly on clever shortcuts *within* mathematics—how, for example, a task which looks computationally or logically daunting can be reduced to manageable proportions by a clever trick. Of course it is only a trick when you see it for the first time; after seeing it used in many different ways you consider it more as a standard technique.

Stewart's second chapter is ‘How politicians pick their voters’ and is largely about how to decide, fairly or otherwise, on the boundaries of electoral regions. It involves the mathematics of shape to explain the anomaly of a party achieving a large proportion of the vote but only a small proportion of elected representatives, the concept of the wasted vote, and the legal minefield of proving a boundary unfair, with reference to Markov chains and Arrow's impossibility theorem. All fascinating, but all purely descriptive; there is no