that the sequence also occurs in this context. On the other hand, it is tempting to prove this directly rather than by appealing to bijection, and an alternative approach is to show that different scenarios yield the same recurrence relation. From this recurrence it is easy to use a generating function argument to deduce the Catalan formula, which tells us that the nth such number C_n is equal to $\frac{1}{n+1}\binom{2n}{n}$. This in turn suggests that it should be possible to devise a direct proof which makes a link to binomial coefficients by, for example, showing that the $\binom{2n}{n}$ ways of selecting n objects from $2n$ can be divided into $n + 1$ classes, each of which contains exactly one Catalan number.

All of these ideas are thoroughly explored in this book. However, you should be warned that this is not a casual read. Nearly everything is presented as an exercise for the reader, and although solutions are provided they are sometimes more in the nature of terse hints, requiring much of the detail to be deduced. There is a brief opening chapter on basic properties and techniques and a useful appendix, contributed by Igor Pak, on the history of the topic, which he manages to trace back to the Mongolian mathematician Mingatu in the 1730s.

As a taster, and without giving too much away, here are some of the Catalan situations which were certainly new to me:

- planar trees for which every vertex has 0, 1 or 3 children, with a total of $n + 1$ vertices with 0 or 1 child;
- symmetric parallelogram polyominoes of perimeter $4(2n + 1)$ such that the horizontal boundary steps on each level form an unbroken line;
- total numbers of fixed points of permutations of $\{1, 2, \dots, n\}$ which avoid the subsequence 132;
- numbers of distinct monomial terms appearing in the expansion of $\prod_{i=1}^{n}(x_1 + x_2 + \dots + x_n)$.

Just in case this is not enough, there is a substantial chapter of additional problems, graded from 1 (routine and straightforward) through 4 (horrendously difficult) to 5 (unsolved) which should keep students busy for a considerable time. The simplest of these is the ungraded problem of explaining the sequence ‘un, dos, tres, quatre, cinc, sis, set, vuit, nou, deu, …’.

This is a novel and intriguing little book which will appeal to anyone who appreciates problem-solving and is fascinated by the connections between different mathematical ideas.

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Classic topics on the history of modern mathematical statistics by Prakash Gorroochurn, pp. 754, £90.50 (hard), ISBN 978-1-119-12792-5, also available as e-book, John Wiley & Sons (2016).

This is a highly ambitious book, following the author's award-winning *Classic Problems of Probability*. It begins with an account of the life and work of Laplace up to his death in 1827, followed by a description of the contributions of Galton, the Pearsons, Fisher, Gosset, Edgeworth et al as far as the 1930s, and ends with the so-called Bayesian Revival.

As well as presenting a scholarly history of the development of Statistics, the traits and foibles of some of the principal contributors are described. De Morgan accused Laplace of seeking to airbrush the prior work of de Moivre, the Bernoullis, Euler and 'above all' Lagrange from history. The testy personal relations between Fisher and others, often played out in the pages of academic journals, are catalogued.

There are photographs of many statistical pioneers, brief biographies, and reproductions of the original pages from diverse celebrated published articles. Detailed mathematical derivations over several pages are given throughout. We are shown how mathematical rigour (e.g. Lyapounov for the Central Limit Theorem, Hamilton Dickson explaining Galton's empirical observations) played its role in giving persuasive steps in the acceptance and applicability of statistical ideas.

Given the period covered, it is no surprise to see the prominence of the contributions of Fisher—a 200-page chapter on the Fisherian Legacy, with two pages of the Index listing entries to his work. Fisher's clash with Neyman and Pearson on how best to test statistical hypotheses is covered in detail; earlier, in the eighteenth century when organised religion was thriving, the arguments about the constant value of the ratio of male to female births, and the planes of the planetary orbits, are shown as steps towards the notion of significance testing.

The book's third and final section has fewer than 100 pages, and makes no attempt to give a complete account of its subject since the end of the Second World War. For example, the terms jackknife, bootstrap, and Markov Chain Monte Carlo are entirely absent from the text; rather, it concentrates on the development of statistical decision theory and the writings of Ramsey, de Finetti, Savage and Robbins about the meanings of probability, and hence statistical inference.

Few writers would attempt to cover this sweep of material; it complements Todhunter's account of the history of probability up to Laplace, and Stigler's history of statistics up to 1900. Fisher was undoubtedly a difficult colleague and adversary, but this book places him firmly as a towering figure in the subject.

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Problem-solving challenges for secondary school students and above by David Linker and Alan Sultan, pp. 181, £18.00 (paper), ISBN 978-9-81473-003-7, World Scientific (2016) .

"The limit does not exist!" exclaims Lindsay Lohan, the crowd goes slightly wild, and our protagonist and her teammates can celebrate and return to their prom and tie up the outstanding plot lines. Thus ends the popular teenage comedy 'Mean Girls', bringing a whole generation up to speed with the machinations of quickfire school mathematics competitions.

The United States remains the spiritual home of such contests. The MATHCOUNTS program for middle-schoolers has been active for over thirty years, and in 2015 had over 250,000 competitors across all states. While this competition builds towards a national final, many regions have their own local equivalents. The New York City Interscholastic Math League is one of the largest, and it is from their involvement with this programme that the authors have drawn their motivation, and many of the problems they present.

There will probably always be an argument to be had about whether it is valuable for children to invest lots of time and energy in solving short but fiddly problems under intense time-pressure. The arguments on both sides are fairly clear. Rapid calculation has little in common with the mathematics that such competitors