JEFF PACHOUD/AFP/GETTY

Despite stereotypes, women in and past menopause rarely report feeling 'deficient' or disempowered.

HEALTH

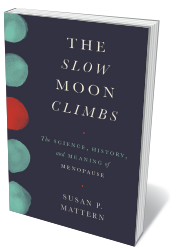
Life after reproduction

Julia Prague investigates a book that draws on evolutionary theories to recast menopause.

In the 1820s, the French physician Charles-Pierre-Louis de Gardanne coined the term menopause. By 1899, the US pharmaceuticals company Merck was selling Ovariin, a treatment derived from dried and pulverized bovine ovaries. Over a century and more of trials and treatments, the medical understanding of menopause has advanced significantly (although not nearly enough), even as cultural attitudes to it have shifted. Now, in her book *The Slow Moon Climbs*, historian Susan Mattern seeks to change the perception of menopause, stressing the natural-selective advantage of living well beyond the reproductive years.

Menopause occurs when concentrations of circulating oestrogen fall, menstruation ceases and natural conception is no longer possible because too few ovarian follicles remain. Many women (around 70% in Western societies) will experience a cluster of symptoms — most typically, hot flushes and difficulty in sleeping. Some may have vaginal dryness and low libido, among other symptoms.

Mattern argues that the modern medical definition of menopause (which emerged just over a century before de Gardanne named it) frames it as a disorder, even a painful ordeal. She draws on archaeology, epidemiology, anthropology, animal reproduction and gerontology to make her point.



The Slow Moon Climbs: The Science, History, and Meaning of Menopause
SUSAN P. MATTERN
Princeton University Press (2019)

By recontextualizing menopause, Mattern seeks to persuade the reader to see it as just a transition into a vital stage of life. *The Slow Moon Climbs* details case studies of rural populations at various points in history and around the world, from medieval Mongolia to twentieth-century Gambia. Through these, Mattern tests evolutionary and anthropological theories while highlighting differences in cultural experience between these groups.

Mattern bases much of her thesis on the 'grandmother hypothesis', first posited by the US evolutionary biologist George Williams in 1957. The gist is that menopause increases post-reproductive lifespan. This is a selective advantage because it enables older women to help rear their children's and allies' offspring in a cooperative-breeding societal structure. Mattern's review of animal research suggests that this selection is most specific to humans, although it exists to a lesser extent in some non-human primates and whales. As mortality has fallen over time, menopause, in effect, has also controlled population size. These advantages, the theory postulates, allowed humans to spread across the globe.

But although these aspects of the book are interesting and worthy of debate, I am not convinced by a key aspect of Mattern's view: that Western medicine and modern culture have had a wholly negative impact on the menopause. She argues that an "idiom of distress" frames the modern menopause — that an important component of the condition is anxiety, triggered by concerns about oestrogen deficiency or lowered status.

In my research with menopausal women in Britain, I have found the opposite to be true. Glad to be period-free, almost none felt they were experiencing 'deficiency'. Instead, they were formidable, achieving all that Mattern argues they should. They were integral in supporting family and friends, and were often at a career peak, all while experiencing hot flushes and sleeping difficulties. Their experience, in fact, reflected that of the women from Indigenous cultures on whom Mattern reports, including Mayan communities in Chichimila, Mexico.

PHYSICAL ROOTS

Mattern seems to claim that unless a condition is experienced in the same way by all women, it must be a cultural construct. I disagree. First, any difference in how women in different populations experience symptoms could be due to a number of factors. Those could range from variation in genetics, diet or climate, to constraints on research methodologies across language, cultures and time periods. Second, hot flushes have been reported in many menopause studies — including some conducted in traditional cultures. Mattern dismisses this, for instance by suggesting that the symptom has been "imported" to countries including Bangladesh.

Nor does she mention the growing body of evidence that implicates a specific neuropeptide in causing menopausal hot flushes. (This is neurokinin B and its receptor NK3R, which connect the central reproductive and temperature-regulating systems crucial for fertility.) She does outline the hypothesis that menopausal women have a shrunken 'thermoneutral' zone — the range of temperatures that trigger neither sweating nor shivering. But this is contested.

Mattern's conclusion is that hot flushes are mostly psychosomatic because a dummy drug — a placebo — can reduce them.

However, placebo effect is demonstrated in a multitude of research studies, irrespective of the conditions investigated. And the magnitude of the effect seems to be similar across many studies (around a 25% improvement in hot-flush symptoms), despite differences in methodologies and research populations.

Furthermore, both traditional cultures and Western women sometimes use herbal remedies for hot flushes. When these remedies are tested in modern clinical trials, they have not reliably been shown to be more effective than placebos.

Modern hormone replacement therapy (HRT) reduces hot flushes by around 80%. Mattern argues that medical advice for menopause is dictated by the availability of profitable treatments. However, recommendations change as new information and understanding arise. For instance, the US Women's Health Initiative trial was terminated early in 2002 owing to fears of increased risk of some cancers, including breast cancer. After this, there was a move away from long-term HRT to prevent the negative effects on the bone and heart that can arise from loss of oestrogen. Instead, it is mostly prescribed for menopausal symptoms (mainly hot flushes), and for only five years (see also J. Marjoribanks *et al. Cochrane Database Syst. Rev.* http://doi.org/f9vrsg; 2017).

"Mattern seeks to persuade the reader to see menopause as just a transition into a vital stage of life."

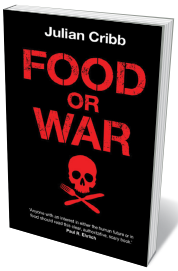
The Slow Moon Climbs adds food for thought on the evolutionary role of post-reproductive lifespan. But I feel that its view of menopause as a cultural phenomenon emanating from modern medicine risks diverting limited resources away from further research. It might even fuel complacency that the condition is 'only menopause', rather than highlighting the fact that the majority of women experience disruptive symptoms. That, in turn, could prevent millions of women from accessing treatment and support — depriving them of an immediate benefit, irrespective of any evolutionary-scale advantage. ■

Julia Prague *is a British clinical and academic endocrinologist, with an interest in treatments for menopausal hot flushes.*
Twitter: @julia_prague
e-mail: juliaprague@doctors.org.uk

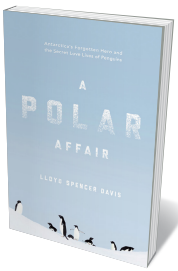
CLARIFICATION

The book review 'Radical reform and the Green New Deal' (*Nature* **573**, 340–341; 2019) noted that Naomi Klein "dismisses" market mechanisms for pricing carbon. It should have said that she "critiques" them.

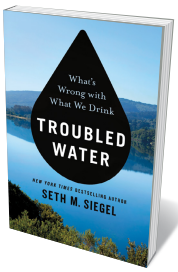
Books in brief



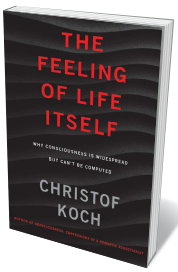
Food or War
Julian Cribb CAMBRIDGE UNIVERSITY PRESS *(2019)*
Hammered by environmental stresses and mismanagement, our food system is inequitable and unstable. As science journalist Julian Cribb argues in this incisive analysis, that can lead to conflict — as it did during the 2007–10 drought in Syria, which devastated crops and helped spark the war. Cribb's bold prescription for sustainable global agriculture envisions harnessing urban waste as a feedstock for 'food loops' and incorporating rooftop farms, 'agritecture', ecological farming methods and funding from redirected military budgets. Devastating and inspiring in equal measure.



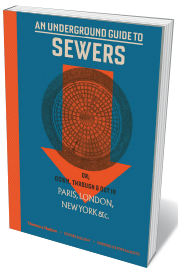
A Polar Affair
Lloyd Spencer Davis PEGASUS *(2019)*
In this intriguing scientific history-cum-memoir, penguin biologist Lloyd Spencer Davis harks back to a pioneering predecessor. George Murray Levick, a physician on Robert Falcon Scott's ill-fated 1910 expedition to Antarctica, became the first to study penguins scientifically as he overwintered in an ice cave. His manuscript, *The Sexual Habits of the Adélie Penguin* (1915), documented behaviours he saw as "depraved"; it was suppressed for a century. Meanwhile Davis, unwittingly treading in Levick's footsteps, uncovered many of the same findings. A rip-roaring read on research at the edge.



Troubled Water
Seth M. Siegel THOMAS DUNNE *(2019)*
US water-supply crises go far beyond Flint, Michigan (see M. Peplow *Nature* **559**, 180; 2018). So reveals environmental writer Seth Siegel in this engrossing, well-reported survey of cases such as that of Hoosick Falls, New York, where contamination with the industrial chemical perfluorooctanoic acid has been linked to kidney cancer. The culprits, he argues, include Congress, the chemical industry and a lax Environmental Protection Agency. Yet, although these stories are grim, the outcomes could be very different if communities had access to filtration, scientific advice and other easy solutions.



The Feeling of Life Itself
Christof Koch MIT PRESS *(2019)*
How is consciousness linked to the fatty, watery organ lodged in our skulls? The mind–body problem has troubled thinkers for millennia. In the past decade, however, experimentation has spotlit some of the conundrum's darker corners, as Christof Koch (president of the Allen Institute for Brain Science in Seattle, Washington) reveals in this invigorating study. Koch tracks the "neural footprints" of experience; swims off the wilder shores of integrated information theory; and speculates about the "feeling of life itself" in ravens, bees and octopuses — along with related ethical concerns.



An Underground Guide to Sewers
Stephen Halliday THAMES & HUDSON *(2019)*
From flush toilets 4,000 years old on the Greek island of Santorini to Eugène Belgrand's elegant Belle Époque sewers under Paris, sanitation has a certain cachet. This splendid illustrated volume by Stephen Halliday swirls through millennia of ingenious waste management. Here are, for instance, London's vast Victorian system designed by Joseph Bazalgette; Tokyo's gargantuan underground discharge channel; and Sedron Technologies' cutting-edge Janicki Omni Processor, which uses steam power and filtration to rapidly convert waste to drinkable water and energy. **Barbara Kiser**