FERNANDO MOLERES/PANOS

The west coast of Greenland is fertile ground for geologists.

GEOLOGY

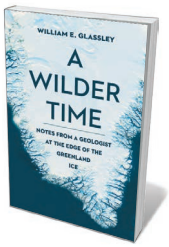
Epiphanies of the edgelands

Ted Nield admires a geologist's layered exploration of Greenland's remote fringe.

Geologist and former surf dude William Glassley has spent six field seasons studying the ancient rock of coastal Greenland. As he probes our planet's youth, three billion years ago, many will envy him. His brief but ambitious *A Wilder Time* demonstrates that there's nothing like geology for acquainting you with the joys of remote isolation at other people's expense.

The area he explores, with Danish colleagues Kai Sørensen and John Korstgård, is vast: part of the coastal fringe of ice-smoothed rock and periglacial tundra that extends like a valance around Greenland's enormous central ice cap. There is sea to the west, crumbling ice cliffs 150 kilometres and more to the east. *A Wilder Time* sees our heroes marooned in this wilderness, alone in the short summer's perpetual day. Glassley eloquently evokes a place where land feathers into Arctic sea, ice floes glide by on mirror-smooth tongues of clear, frigid water and silence reigns.

What drew the companions there might sound, by contrast, like a storm in an academic teacup. Someone (tactfully left unnamed) had published a paper attacking the established geological view that the study area — between Nordre Isortoq in the south and Disko Island to the north — is part of the roots of an ancient mountain range, the Nagssugtoqidian mobile belt. Geologists are familiar with these Inuit place-names, many ending in 'oq'. Pronunciation should sound, the late Stephen Moorbath (an isotope geochemist and geochronologist) once told me, "like a piano string being cut at the bottom of the ocean".



A Wilder Time: Notes from a Geologist at the Edge of the Greenland Ice
WILLIAM E. GLASSLEY
Bellevue Literary Press: 2018.

Moorbath helped to make the area famous by finding what are still among the oldest known rocks on Earth, almost 3.8 billion years old. In the 1960s and 1970s, geologists Arthur Escher and Juan Watterson mapped these high-grade metamorphic melanges of altered sediments, mantle rocks and ocean-floor basalts. In the 1980s, Feiko Kalsbeek, Bob Pidgeon and Paul Taylor interpreted it all in the light of plate tectonics. The distinctive east–west shear zones that transected the region were, they said, sutures left by the most ancient plate-tectonic collisions on our planet, during the early Proterozoic eon, which began around 2.5 billion years ago. But seeds of doubt were cast. The new paper made fundamental challenges to earlier interpretations that seemed themselves so misguided and riddled with errors and misconceptions that they could not go unanswered.

Such is the scientific narrative underpinning *A Wilder Time*, whose rather overcomplicated structure arrives at a satisfying conclusion. The epilogue demonstrates how Glassley's team confirmed and even refined the original interpretation of the mobile belts, putting its assailants to flight.

This story offers perspectives on deep time to boggle minds, from the immense ages of

the rocks and events concerned. Metamorphic petrology is no easy material for popular science. By the time you explain how the phyllites, schists and gneisses started life, why they were taken to the depths of Earth's crust and how their minerals were changed under combinations of heat and pressure (each producing distinctive suites of new minerals), many readers will have lost interest. Wisely, Glassley doesn't try too hard — which is fine, because the science is almost a narrative ploy.

Natural scientists may be the only intellectuals these days who find themselves routinely exposed to the transformative experience of wilderness. Yet (as I have seen during desert fieldwork in the Middle East) on many of them it seems wasted. This may not be their fault. Expeditions, such as Glassley's, are a lesson in how travel can narrow the mind. It is hard enough to keep focused on the work when trying to cope with midges, heat, cold, disorientation, altitude and homesickness, never mind dehydration, disgusting camp food and the physical consequences. It takes a deep attunement to the wild's allure to keep appreciating the surroundings.

Glassley's vivid impressions of West Greenland attempt what few scientist-writers try: to explore beyond the comfort zone of his field. Followers of the medieval philosopher Duns Scotus coined the terms haecceity ('thisness', of specific things) and quiddity ('whatness', of the classifier). These are 'science'. Glassley tries also to grasp something beyond: the noumenon, an ineffable inner reality in things that cannot be discerned by the senses.

Not everyone experiences this psychological epiphany. Scientists sometimes have it trained out of them by the relentless insistence on cold measurement. Glassley, by contrast, seems obsessed with our limitations when it comes to grasping the wholeness of the world. He questions, for instance, how our 'reality' contrasts with, say, a seal's, or a fish's. Absenting himself from camp, he wanders alone with his reflections, and attempts closer communion with the hidden genius of place.

Although he repeatedly explains what he's attempting (a scientist's tendency to write abstracts for everything?), he is not always successful; yet I enjoyed and admired the attempt. What he gropes for requires art, not analysis. Perhaps that was why I kept returning to Hugh MacDiarmid's great 1934 poem, 'On a Raised Beach', which explores the limitations of science in expressing the wholeness of nature. After an opening parody of scientific language, the poet observes: "Deep conviction or preference can seldom/Find direct terms in which to express itself". ■

Ted Nield *is editor of* Geoscientist *and author of* Supercontinent. *In an earlier life, he, too, sensed the noumenon in remote places at other people's expense.*
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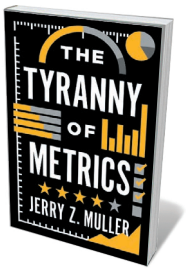
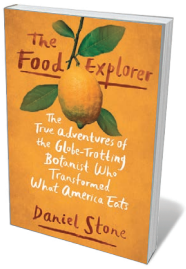
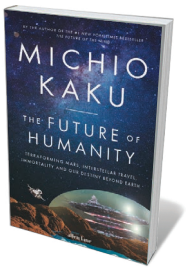
Books in brief



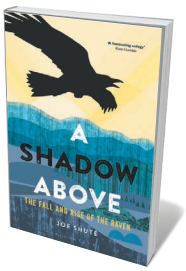
The Tyranny of Metrics
Jerry Z. Muller PRINCETON UNIVERSITY PRESS *(2018)*
Economic historian Jerry Muller delivers a riposte to bean counters everywhere with this trenchant study of our fixation with performance metrics — a cultural ubiquity saturating education, medicine, finance and governance. As he argues, this reductive approach to monitoring efficiency almost inevitably backfires. It can lower morale by riding roughshod over professionals' experience; invite manipulation, from "gaming the stats" to "teaching to the test"; discourage innovation, promote short-termism; and reward dumb luck. Metrics, he asserts, can usefully bolster judgement, but not supplant it.



The Food Explorer
Daniel Stone DUTTON *(2018)*
In the annals of intrepid botanists combing the globe for novel species, David Fairchild is a name to conjure with. At the turn of the twentieth century, the plant scientist introduced 200,000 'exotic' species to the United States, then something of a culinary blank slate. Kale, avocados, mangoes, pomegranates and even quinoa began to work their way into US consciousness and, eventually, markets. Daniel Stone's rip-roaring tale takes us from Fairchild's youthful meeting with naturalist Alfred Russel Wallace in Kansas to collecting trips across more than 50 countries, from Trinidad to China.



The Future of Humanity
Michio Kaku DOUBLEDAY *(2018)*
This latest foray into futurism by Michio Kaku sees the physicist unbowed by woes political and planetary. As a master of the long view, Kaku plots humanity's path to becoming a "multiplanet species". He marshals fresh advances in artificial intelligence, nanotechnology and bioengineering for his vision, segueing from lunar stations and Martian colonies to interstellar travel and human genetic engineering. There's plenty of hypothetical innovation, too: ramjet fusion machines, antimatter engines and "laser porting" of human connectomes to enable bodiless exploration of the cosmos.



A Shadow Above: The Fall and Rise of the Raven
Joe Shute BLOOMSBURY *(2018)*
Size-wise, the king of corvids is the raven. But for journalist Joe Shute, the bird is also an emblem of our age, caught between the ebb of wilderness and the hope of regeneration. In Britain, after a long, catastrophic decline, numbers have bounced back by 45% over the past two decades. Celebrating that fact, Shute gets inside the skin of the 'feathered ape' with the "rhino-horn beak" and aerial virtuosity. That journey becomes a rich and beguiling tangle of cultural and natural history, birding diary and account of corvid fandom — Charles Dickens being one notable devotee.

Making the Monster
Kathryn Harkup BLOOMSBURY SIGMA *(2018)*
Chemist Kathryn Harkup's scientific contextualization of Mary Shelley's *Frankenstein* at 200 is a worthy addition to a crowded shelf. She explicates how trailblazing discoveries in galvanism, chemistry and anatomy helped to form the bones of the book, while its heart beat to the rhythm of Shelley's radical intellectual lineage and milieu. Harkup's handling of Shelley's own story and the literary alchemy wrought by this brilliant teenager compels, not least on how the science fiction has seeped into science fact. **Barbara Kiser**

CORRECTION

The Books & Arts article 'Epiphanies of the edgelands' (*Nature* **554,** 166–167; 2018) incorrectly referred to East Greenland instead of West Greenland.