

## Books & arts

could never elucidate the complexities of mammalian memory systems. In fact, Kandel discovered that as the slug learnt which environmental conditions required it to suck in its gills for protection, its synapses – structures that allow electrical or chemical signals to transmit between neurons – were altered.

He went on to describe the neural circuitry and molecular biology involved in short- and long-term memory in the slugs. Determining these principles won him the Nobel prize, and they have proved true for all creatures, humans included. Post-Nobel, he has studied memory in higher organisms including mice, turning out high-profile papers well into his eighties.

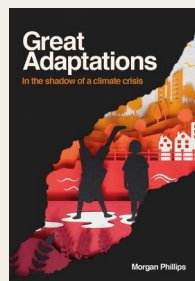
The Nobel experience widened Kandel's horizons beyond experimental science. The success of *In Search of Memory* awakened in him the desire for broader communication. I met him in Vienna in 2008, when a German-language documentary based on this book was about to have its premiere (*Nature* 453, 985; 2008). Radiating energy, he had started to make peace with the city of his birth.

His new book relates how, following the prize, Austria's president, Thomas Klestil, made overtures. Kandel initially rebuffed them, saying that he considered himself a Jewish American scientist. But then he proposed that Klestil honour him by setting up a symposium at the University of Vienna on Austria's response to the Nazi doctrine of National Socialism, and its implications for science and the humanities. Since that symposium, in 2003, Kandel has acted as an adviser to a couple of Austrian neuroscience organizations. "My relationship with Austria is becoming more comfortable, although it's got a way to go," he writes.

Since the 1960s, he has collected twentieth-century German and Austrian expressionist art, an interest that led to his 2012 book *The Age of Insight: The Quest to Understand the Unconscious in Art, Mind and Brain, from Vienna 1900 to the Present*. This superb volume illuminates the period when modernists of all shades were engaging with the internal workings of the mind. Sigmund Freud was developing psychoanalysis; novelist Arthur Schnitzler was pioneering the interior-monologue mode of narration; expressionist artists including Gustav Klimt, Oskar Kokoschka and Egon Schiele were portraying subjective emotions. Kandel guides readers through this cultural history and describes how the neuroscience of perception explains so much of our intuitive understanding of art. It epitomizes Kandel's breadth of vision. There has indeed been life after the Nobel prize.

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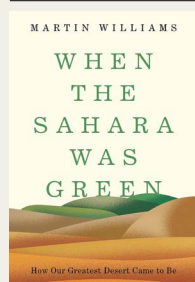
## Books in brief



### Great Adaptations

Morgan Phillips *Arkbound* (2021)

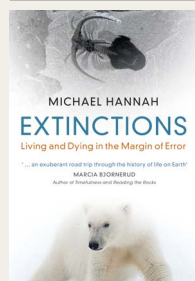
Until recently, climate-change activists advocated mitigation of rising global carbon dioxide levels — adapting to them was considered inappropriate or defeatist. Morgan Phillips disagrees. As the UK-based director of the Glacier Trust, which works with remote Nepalese mountain communities, he pragmatically supports mitigation and adaptation. He advocates that "Western civilization" be urgently but carefully "disassembled" to avoid climate catastrophe. His proposed adaptations seem mostly feasible and humane — if challenging.



### When the Sahara Was Green

Martin Williams *Princeton Univ. Press* (2021)

On Saharan desert rock, prehistoric artists engraved or painted scenes of cattle camps and herds of giraffes and elephants. Even hippos flourished by lakes. Some 15,000–5,000 years ago, the region was green: the tropics received more solar radiation than they do now, which strengthened the monsoon and brought both summer and winter rains. This vivid historical survey by Earth scientist Martin Williams is the result of a lifetime's work. Are humans responsible for the region's current aridity? No, says Williams.



### Extinctions

Michael Hannah *Cambridge Univ. Press* (2021)

One well-documented estimate puts the number of living species at 8.7 million, excluding bacteria and archaea. If correct, this represents less than 1% of species that have evolved and gone extinct since the first appearance of life 3.7 billion years ago, notes palaeontologist Michael Hannah in his measured, thought-provoking analysis. He says the cause of past mass extinctions is a "fraught subject" and has no doubt that humans will cause another, possibly in "as little as 240 years", unless we stop damaging the biosphere and the atmosphere.



### Move

Parag Khanna *Weidenfeld & Nicolson* (2021)

"Mobility is destiny," says entrepreneur Parag Khanna. Born in India, educated in the United States and United Kingdom, and now US-based, he has been to more than 150 countries. His timely, contentious study of mass migration observes that nearly 40% of US scientists are foreign-born, along with more than two-thirds of US tech-company employees, who come mostly from India and China. Yet he makes little attempt to analyse the complexities of migration in these cosmopolitan occupations; his index includes neither 'research' nor 'science'.



### The Next Apocalypse

Chris Begley *Basic Books* (2021)

Underwater archaeologist and survival coach Chris Begley is intrigued by apocalypses, such as the collapse of the ancient Maya culture in Central America. His intriguing book begins in Honduras, with a campfire discussion about a 'lost city' with an Indigenous Pech man, who believes it inhabited by gods that fled Spanish colonial invaders. However, "this is not a doomsday book". Surviving apocalypse, he says, depends not on lone heroes and escape, but on communities rebuilding with new structures and systems. **Andrew Robinson**