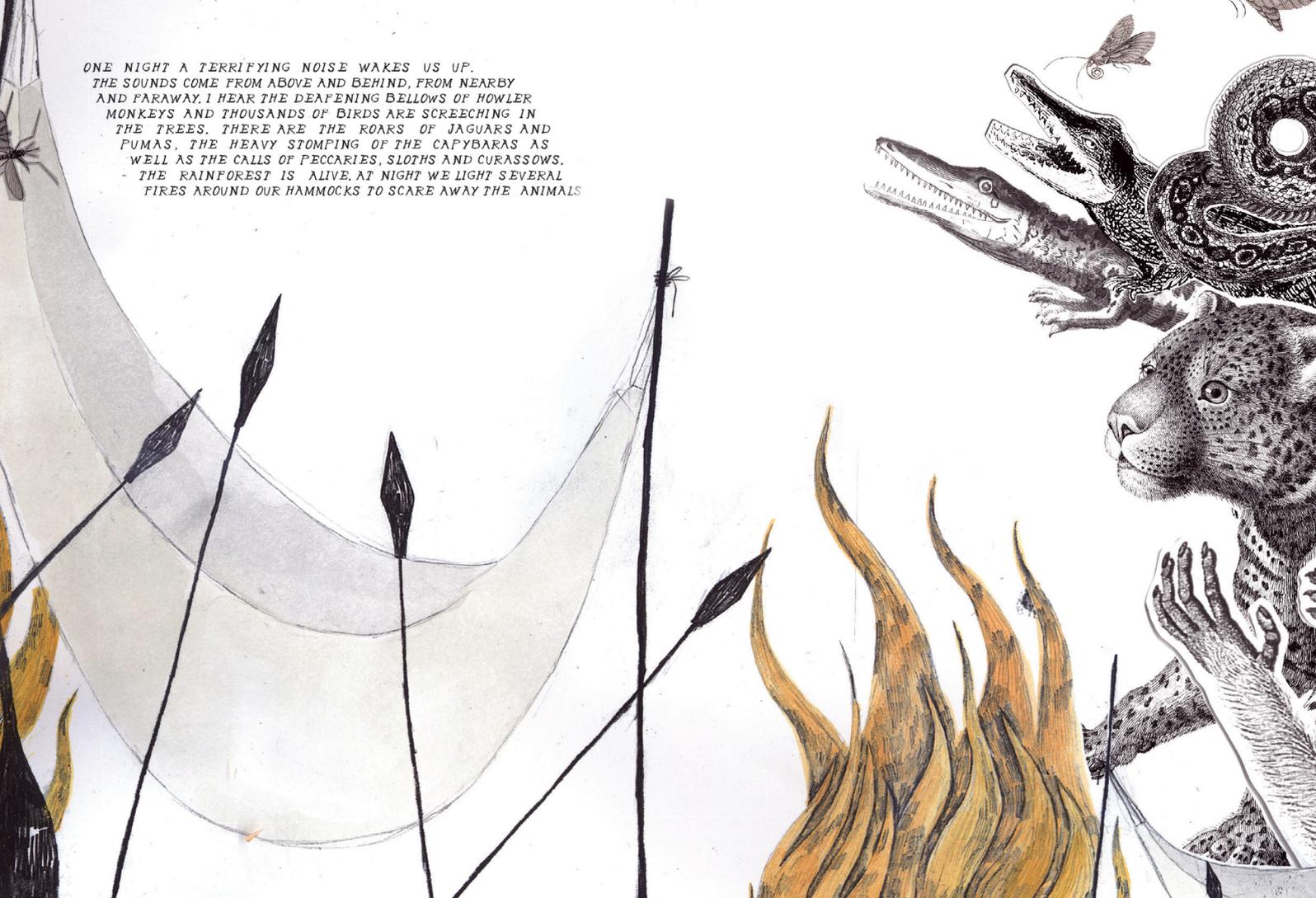


ONE NIGHT A TERRIFYING NOISE WAKES US UP. THE SOUNDS COME FROM ABOVE AND BEHIND, FROM NEARBY AND FARAWAY. I HEAR THE DEAFENING BELLOWS OF HOWLER MONKEYS AND THOUSANDS OF BIRDS ARE SCREECHING IN THE TREES. THERE ARE THE ROARS OF JAGUARS AND PUMAS, THE HEAVY STOMPING OF THE CAPYBARAS AS WELL AS THE CALLS OF PECCARIES, SLOTHS AND CURASSOWS. - THE RAINFOREST IS ALIVE. AT NIGHT WE LIGHT SEVERAL FIRES AROUND OUR HAMMOCKS TO SCARE AWAY THE ANIMALS



A scene from Alexander von Humboldt's travels in South America.

HISTORY OF SCIENCE

Humboldt: the graphic novel

Alison Abbott applauds an illustrated treatment of the Prussian naturalist's exploits.

Four years ago, the historian Andrea Wulf rescued Prussian naturalist Alexander von Humboldt (1769–1859) from relative international obscurity with her delightful biography, *The Invention of Nature*.

To celebrate the 250th anniversary of Humboldt's birth this year, Wulf has teamed up with artist Lillian Melcher to create *The Adventures of Alexander von Humboldt*, a graphic work of non-fiction depicting Humboldt's five-year exploration of Latin America as a young man.

It was a time when scientists had become obsessed with measuring and documenting all aspects of their environment, from human features to the elevation of hills. But no one took investigation of the environment further than Humboldt — and no one thought as seriously about how the measurements could be integrated into a holistic understanding of our globe.

The tale of adventure and discovery is

well suited to the graphic format, and Wulf and Melcher do it proud. The informative, light-hearted text and inventive illustrations bring Humboldt's rumbustious character to life as he drags his small posse of companions well beyond their comfort zones: up smouldering volcanoes, down treacherous mine-shafts, along crocodile-filled rivers, through rainforests thick with mosquitoes.

The travellers carried the most up-to-date scientific instruments — often decidedly fragile — to measure as many physical parameters as they could. (Humboldt's precious barometer, with its modest

supply of spare glass tubes, makes frequent appearances in the book.) They also carried plenty of notebooks: Humboldt meticulously recorded each measurement taken and each species of flora or fauna encountered. Melcher often arranges her illustrations in collage compositions using pages from these notebooks.

HUNGRY FOR KNOWLEDGE

Reading about Humboldt's extraordinary achievements makes you wonder how he ever came to have been so forgotten outside Germany. His appetite for knowledge was voracious and he let nothing — not even personal danger — stand in the way of gathering data on every aspect of the natural world.

His capacity for synthesizing knowledge was equally vast, allowing him to build up his major theory that everything in nature is connected (reaching fruition in his massive 1845–62 tome *Cosmos*; see A. Abbott *Nature* 431, 631; 2004). Perturbing any element of



The Adventures of Alexander von Humboldt

ANDREA WULF AND LILLIAN MELCHER
Pantheon (2019)

ANDREA WULF/LILLIAN MELCHER

MEDICINE

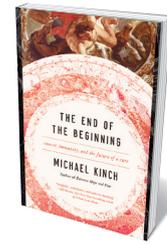
Cancer's magic bullet returns

Tumour immunology has travelled a long and bumpy road. **Gerard Evan** examines an uneven treatment of it.

I confess: back in the 1970s, I was a tumour immunologist, entranced by the idea that incipient cancers are constantly erupting in our bodies and routinely culled by our own immune systems. But in the 1980s, it became clear that people with suppressed immune systems (such as people with HIV, or those taking immunosuppressive drugs after transplants) remained stubbornly — and happily — free of the commonest cancers. So I lost faith and retreated to the more immediately fruitful research areas of cancer-causing genes and tumour suppressors.

Now, decades on, I am enjoying an emotion peculiar to academics. Let's call it reverse *schadenfreude*: a combination of excitement, optimism, admiration, delicious irony and humility that comes with the realization that I got it wrong. Big time.

The past decade has seen key cancer treatments — surgery, chemotherapy and radiotherapy — augmented and even supplanted by a host of drugs engineered to hit specific targets in cancer cells. Leading the pack is a revolutionary development: our emerging ability to coerce our immune systems to



The End of the Beginning: Cancer, Immunity, and the Future of a Cure
MICHAEL S. KINCH
Pegasus (2019)

treat cancer. Cancer immunotherapies are curing some people for whom all other treatments have failed, engendering excitement. But in truth, the field's trajectory has been long and stumbling, from its nineteenth-century roots as a theoretical concept through to that twenty-first-century status at the cutting edge of cancer care. Michael

Kinch's *The End of the Beginning* gives an account both personal and compendious.

Kinch, now at Washington University in St. Louis, Missouri, co-developed an early antibody-based cancer immunotherapy in the 2000s, and he writes with passion and authority. He deftly describes how each immune system is unique, shaped in part by individual histories of infection. Our newborn immunity starts off relatively non-specific, and is ▶

nature's giant web, whether a species or a local climate, will have knock-on effects, he argued. He presciently warned, for example, that deforestation could harm the climate and environment, because forests moisten and cool the atmosphere and prevent soil erosion.

He was friends with other intellectual giants of his time, including polymath Johann Wolfgang von Goethe, and Charles Darwin acknowledged the intellectual debt he owed Humboldt. Many phenomena are named after him, from the Humboldt Current that flows along the western coast of South America to the stately Humboldt Peak in Colorado's Rocky Mountains. Numerous plant and animal species bear his name, too — and many German cities have a Humboldtstrasse.

Humboldt was a liberal who vocally opposed slavery. He was a driven and highly focused scientist. He was a man of near-infinite self-confidence. *The Adventures of Alexander von Humboldt* offers a splendid way to begin to know him. ■

Alison Abbott writes from Munich, Germany.

See go.nature.com/2ykzd9c for more images from *The Adventures of Alexander von Humboldt*.



A build-up of white blood cells (shown in purple) in chronic lymphocytic leukaemia.

