

geography as well as those on the economics, vegetation, fauna and statistics of regions, countries and cities. Interest in archaeology and the study of ancient inscriptions also increased in Europe because those subjects were widely covered by Muslim authors.

The first Muslim book of general geography to be published in Arabic in Europe (in Rome in 1585) was *Garden of Strange Things of the Earth and Lands* by a previously unknown Ottoman author called Sālāmīs b. Gündoğdi aş-Şālihī. Its influence on European knowledge cannot have been great, because it was never translated. The second such book, by contrast, had an immense influence. Translated into Latin in abridged form in 1619 under the misleading title of *Geographia Nubiensis*, the book was al-Idrisī's famous *Journey of Those who are Amazed*, written for the Norman king Roger II in Sicily in the twelfth century. It accompanied

al-Idrisī's world map, the Tabula Rogeriana, showing a dagger-shaped Africa and the confluence of the Indian and the Atlantic Oceans.

Sezgin ends his review in the seventeenth century, when European geographical activities began to overtake the Muslim effort. He singles out for praise the huge efforts of the European orientalists. From the late eighteenth century onwards, they unearthed huge amounts of material from the libraries and book shops of Islamic countries, transporting it to European libraries for study. This was despite the devastation of the Crusades that began in the eleventh century, the Mongol invasions of the thirteenth century and subsequent years of neglect. Sezgin's eulogy stands in contrast to the attack on the orientalists by Palestinian-American cultural critic Edward Said, who called them sinister servants of imperial powers.

The importance of Sezgin's series cannot

be overestimated. It opens up a little-known world, much of which was forgotten even in Muslim countries. And it contains some unexpected gems, including the best assessment of German geographer Carl Ritter's 20-volume work on comparative geography (1822–59), often misrepresented as a book of history with a teleological bent. Sezgin's books also confirm the intellectual place of seventeenth-century Turkish travel writer Evliya Çelebi as an original thinker and observer in the Ottoman world, a fact that is under-appreciated.

The first two volumes of Sezgin's series are translated into English; I hope that the rest will soon follow. Sezgin's immense scholarship deserves a wide readership. ■

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FICTION

Attack of the killer fungi

Philip Ball applauds physicist Paul McEuen's debut thriller about a madness-inducing mould.

One of my more humdrum obligations as a science commentator was to read Michael Crichton's *Prey*, his 2002 thriller based on the premise of nanotechnological robot swarms run amok. As a novice in this genre, I found myself comparing his characters' psychological implausibility to the illogical quirks of figures from myth and legend. But with guns.

Crichton made millions with his formula; *Spiral* deserves to do the same for Paul McEuen, a physicist at Cornell University in New York. His debut novel is more enjoyable and more palatable than Crichton's and boasts impeccable science.

Even so, nothing in *Spiral* bucks the thriller formula. Every scene is tailored for the screen, and the film rights have already been sold. The dialogue reflects how people speak in blockbusters, not in real life, and the story has the familiar cast: the vulnerable but plucky mother, the ruthless assassin, the sadistic billionaire, the child in peril, and so on. There's the race against time, the apocalyptic threat. And, just as films like this offer a great ride when done well, so too does *Spiral*.

The fictional tale begins at the end of the Second World War, when young Irish microbiologist Liam Connor is brought on board a US warship to witness the effects of a devastating biological weapon developed by the Japanese: a fungal infection called the

Uzumaki that induces hallucinations and madness, and is ultimately fatal. Connor ends up hiding away a tiny vial of the stuff, wrestled from the Japanese engineer Hitoshi Kitano who was responsible for developing it.

Sixty years later, Connor is an octogenarian with a Nobel prize, and still in active research at Cornell. Unknown to the authorities, he has for decades been secretly searching for the cure that he is sure will one day be needed for the Uzumaki. Aware that a cure would turn the deadly fungus into a potential weapon by conferring protection only on some, he is determined to keep his work from the US military. Then he is found dead at the bottom of a gorge, apparently having thrown himself off a bridge to escape from a mysterious woman caught on security cameras. His coded last message to his colleague Jake Sterling, his granddaughter Maggie and her son Dylan makes them the only people who can prevent a global outbreak of the killer fungus. But who is behind the fiendish scheme to release it?

You can see a lot of the plot coming — the denouement even involves the old chestnut of who gets to the gun first. But that doesn't detract from the page-turning quality. It is a delight to see how McEuen — an expert in carbon-nanotube physics and nano-electronics — has marshalled his knowledge to kit out the technical plot devices. Nanotech-



Spiral: A Novel
PAUL MCEUEN
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nology, microbiology, information technology and synthetic biology are all brought into play in a convincing, enforced manner. Devotees of scientific trends will recognize many elements, from genetically engineered oscillating fluorescence to microfluidic labs-on-chips.

McEuen shows that the imagination of an inventive scientist is far more interesting than that of a writer who has merely done his homework. In his use of science he trumps Crichton and many other novelists who like to spice their narratives with cutting-edge science. I confess that my interest finds less purchase with square-jawed, stolid heroes like Jake, whose physical prowess and ex-army credentials are carefully established in preparation for gutsy displays. But that is the genre, and Jake is less tiresomely bland than the wooden leads in the books of Dan Brown and Crichton.

A more appealing hero is Cornell University itself, which enjoys a touching love letter here from the author. But, as ever, the stars of the show are the villains: the microcrawlers that scabble ominously across the book's cover — microelectromechanical devices with a seriously bad attitude.

Next time, McEuen should allow himself to push harder at the genre's boundaries. And I do hope there will be a next time, if he can escape the lab bench and the jaws of Hollywood. ■

Philip Ball is a writer based in London. His latest book is *Unnatural*.