

## Bedeviled: A Shadow History of Demons in Science

**Jimena Canales**

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Jimena Canales's captivating popular science text *Bedeviled* concerns the conceptual "demons" that drive scientific innovation.

While scientists reject notions of demons in religions and superstition, Canales says, they also conjure a different sort of demon in their thought experiments; these "demons" are key to their scientific inquiries. Such imaginary beings can see and do things that defy the known principles of the universe. Operating under their own unique rules, such "demons" animate groundbreaking theories and scenarios that would otherwise be regarded as impossible.

Rene Descartes opened the door with his "evil genius," who explored the "porous boundary between the real and the unreal." Pierre-Simon Laplace envisioned a more mechanistic intelligence, while James Clerk Maxwell's "sorting" demon, the most powerful of them all, could theoretically "stop entropy, put an end to decay, and make the world run in reverse."

The demons—particularly Maxwell's—paved the way for modern explorations of chaos, uncertainty, consciousness, and quantum mechanics, among other revolutionary ideas. Canales's chapter on quantum theory includes a dazzling exploration of demons in the work of Albert Einstein, Marie Curie, Max Planck, and other scientists who "pored over the vast stores of accumulated scientific knowledge, hoping to understand this new land of opportunity." Their discoveries are described with clarity and insight: "If Laplace's creature was law-abiding and Maxwell's demons were law breakers, quantum demons were law benders."

Although Canales notes that the so-called demons of physics may be the most famous, such imagined creatures are at play in many other fields, too; she nods to them in biology, artificial intelligence, and economics, making *Bedeviled* a brilliant, challenging overview of the myth-driven scientific endeavors that transform human understandings of the world.

KRISTEN RABE (November / December 2020)

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