

NONFICTION

Want to Get Sucked Into a Black Hole? Try This Book.

Marcus Chown's "A Crack in Everything" is a journey through space and time with the people studying one of the most enigmatic objects in the universe.



By Katrina Miller

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A CRACK IN EVERYTHING: How Black Holes Came In From the Cold and Took Cosmic Centre Stage, by Marcus Chown

When writing about the complexities of our universe, the astronomer turned author Marcus Chown goes straight to the deep end. His book, "A Crack in Everything," tells the stories of scientists on the quest to demystify black holes, and it starts with Albert Einstein's counterintuitive description of gravity.

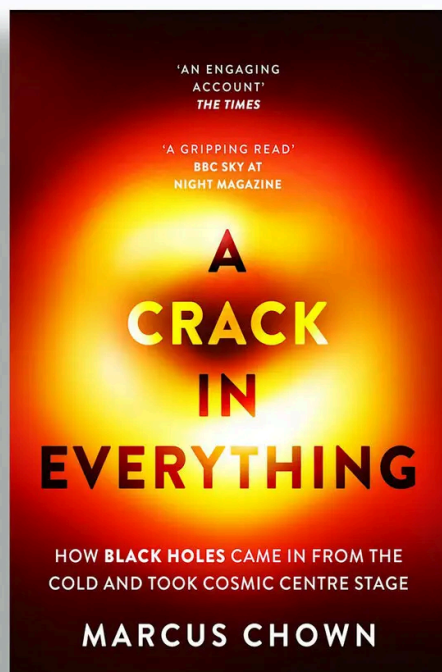
That gravity is a force — some invisible pull attracting your pencil to the floor — is an illusion, Einstein suggested. What we perceive as gravity is instead the warping of space and time around a massive object, like how plopping a bowling ball onto a soft mattress will curve the sheets surrounding it.

It was a revelation that completely upended the way physicists thought about the universe. But, Chown explains, it also led to a horrifying realization. If that massive object was squeezed small enough, like a star that has run out of fuel and collapsed under its own weight, the warping around it would grow so steep and so powerful

that the object would simply cease to exist. Einstein's new theory of gravity, known as general relativity, gave birth to a monster that he never escaped: the black hole, a cosmic entity with the mass of millions or billions of suns that will devour anything in its wake.

"They are the stuff of physicists' nightmares," Chown writes, the afterlives of too-big, burned-out stars swallowed by their own gravity, creating an infinitely dense pit of who-knows-what, because in the belly of a black hole, the laws of physics just stop making sense. As the author concludes, "No wonder Einstein never believed in black holes."

Chown's book is primarily a chronicle of the researchers who helped make black holes believable, not just for the Einsteins but for everyone else. He has plumbed the historical record and conducted interviews with pioneers like the New Zealand mathematician Roy Kerr and the British astronomer Paul Murdin, weaving into the stories of their lives and work the uncanny mechanics of the invisible *bête noire* they helped reveal.



At times, Chown's writing is downright poetic. Two black holes "locked in a death spiral," he writes, "launched a tsunami of tortured space-time" — gravitational waves that reverberated across the cosmos and, notably in 2015, into the detectors of eagerly awaiting astronomers on Earth, direct proof that black holes exist. But elsewhere, Chown's scientific descriptions are difficult to follow, even dizzying. How does the average reader comprehend, for example, that inside a black hole, "space and time become so distorted that they effectively swap places"?

The best parts of "A Crack in Everything" lie between the passages of scientific flair, where Chown brings the heroes of physics past alive. We see Karl Schwarzschild of the Schwarzschild radius, the equation describing the size of a black hole, making his discovery while suffering from painful, chronic skin blisters as a soldier in World War I. Years later, we glimpse Subrahmanyan Chandrasekhar of the Chandrasekhar limit, a way to identify the stars that might someday become black holes, doing his calculations by starlight on the deck of a steamship bound for Cambridge, his mind ranging "freely among the embers of dying suns."

Each chapter in the first half of the book introduces one or two protagonists to root for on their way to the next big discovery. But as the knowledge develops, so too do the scientific instruments and methods, and the number of people needed to push the science forward balloons. By the 1990s it is impossible to keep track of all of the players involved, and Chown mostly abandons his main-character strategy. That does not, however, impact his ability to set up the stakes for each new breakthrough and detail all of the magic and mishaps that come with doing science.

It may be difficult to relate to the genius required to ponder cosmic enigmas. But Chown makes sure you empathize with the rush to get to publication first; the utter exhaustion of consecutive 16-hour night shifts at the observatory, piecing together the first picture of a black hole; and the despair that astronomers felt when the first images from the Hubble Space Telescope came back blurry.

Chown wants us to think a little more tenderly of black holes, too. They are not destructive monsters gobbling up everything in their vicinity, but rather passive predators, waiting for prey to fall their way. Nor are they always ominously black, but often “the most brilliant beacons in creation,” stirring up some of the brightest light in the universe as they feed. By the time you finish “A Crack in Everything” you will see black holes for what they really are: vibrant, spinning hearts around which star matter whirls, coaxing the growth of galaxies and forming a path for the emergence of planets, even life itself.

A CRACK IN EVERYTHING: How Black Holes Came In From the Cold and Took Cosmic Centre Stage | By Marcus Chown | Apollo | 334 pp. | \$30

Katrina Miller is a science reporter for The Times based in Chicago. She earned a Ph.D. in physics from the University of Chicago. More about Katrina Miller