

## BOOKS

# Red Tape and Research

In a cautionary tale, technology is corrupted by bureaucracy

BY STEPHEN CASS

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Carter Scholz's novel is a tale of the dark side of government-sponsored R&D. In it, he examines the workings of a thinly veiled version of the Lawrence Livermore National Laboratory known as "the Lab." It's the mid-1990s, and the Lab is in search of a post-Cold War mission, and no one, not even its hapless directors, can quite control it.

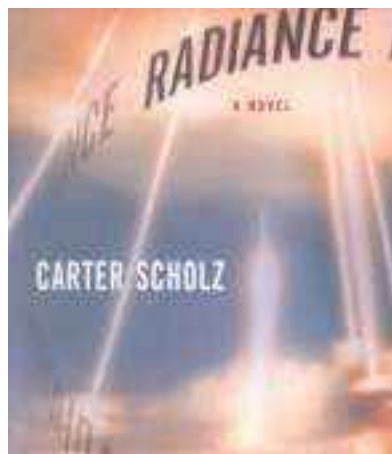
*Radiance* paints a picture of a research establishment that co-opts brilliant and dedicated individuals into perpetuating its own existence instead of serving the national interest. Presidents and senators come and go, but the Lab remains. Projects that fall out of political fashion or show no technical merit continue anyway, cloaked by an assortment of more palatable disguises (Star Wars becomes a defense system against rogue asteroids).

The book begins with the collapse of the Lab's Superbright project. This is an attempt to develop a satellite-based X-ray laser powered by a nuclear explosion, which would simultaneously shoot down dozens of intercontinental ballistic missiles during its brief active life. Philip Quine, a once-promising physicist, is charged with creating a theoretical model that will accurately predict the laser's behavior. But Quine suspects that the scientific basis for the project is quite shaky, little more than simulations massaged to fit dubious experimental data ("It's a case of data not conforming to theory," quips one character).

Meanwhile, the Lab's director, Leo Highet, is hell-bent on presenting the government with favorable results from an upcoming test of Superbright. But Quine manages to demonstrate that the test's evi-

dence for the project's success is nothing more than an experimental artifact. In the ensuing political storm, Highet is ousted and Quine elevated to the directorship.

Most books would end here, but it is at this point the story really hits its stride. As Quine tries to bring the Lab to heel, he invariably finds himself pushed further and further away from his original good



## RADIANCE

By Carter Scholz

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intentions by the conflicting demands of his job, his antinuclear activist girlfriend, his government, and the Lab's founder. This imposing presence is an obvious caricature of Edward Teller, right down to his gnarled walking stick and a penchant for writing letters to the President purely as a private citizen—but on Lab letterhead [for more about the real Teller, see "A Scientific Warrior," *IEEE Spectrum*, October 2001, pp. 65–66].

Scholz writes with such attention to detail that *Radiance* could almost be the work of a 20-year Lab veteran rather than an author of short science fiction stories.

At times, though, his love of technical minutiae goes awry. He lifts the names of some characters from computing or engineering terms, so that a Dr. Mosfet shares the pages with a mysterious Devon Null. (For anyone scratching their heads, a MOSFET is a metal-oxide semiconductor field-effect transistor, while /dev/null is the name of a special file where the Unix operating system dumps unwanted output.) If you have a technical background, it's rather like watching a medical drama in which all the characters have names like Nurse Forceps or Dr. Antibiotic.

That said, the science in *Radiance* is convincing, even when it dares to explore in depth the problems of a laser-based inertial confinement fusion device. Called Avalon, it replaces Superbright as the Lab's biggest project and may have its own scientific Achilles' heel.

But even more convincingly depicted is the Lab's bureaucracy and its unending stream of meetings, reviews, and reports. Clearly, if Quine is not to lose sight of the forest for the trees, he may have to cut some corners, maybe sign off on a 20-or-so-volume report without reading every last word. But who knows just what has been slipped into those pages?

Is the book an accurate portrayal of Lawrence Livermore National Laboratory? No. It is, after all, a work of fiction, borrowing background and color from others' published accounts of Lawrence Livermore's people and projects. But it does provide a theoretical model for anyone seeking to understand how organizations can take on a life of their own or how research programs such as an antiballistic missile system can be nurtured for decades without showing significant progress. Taken in that light, *Radiance* makes worrying—but compelling—reading. ●