



*The Idea Factory: Bell Labs and the Great Age of American Innovation*

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Readers of a certain age will recall a time when Bell Labs was widely regarded as the foremost research and development organization in the world. Those of a later generation will be amazed to learn how many of the technologies that make up today's digital world were invented at, or further developed by, Bell Laboratories.

Jon Gertner tells the story of this remarkable organization, from its formation in 1925 through its partitioning in the Bell System break-up of 1984. It is a story about people: Mervin Kelly, the legendary Bell Labs President, the architect of the organization; William Shockley, John Bardeen and Walter Brattain, inventors of the transistor; Claude Shannon, the father of information theory; John Pierce, an early champion of the first communication satellites. It is a story of inventions, most notably of the transistor, the linchpin of the digital revolution, but also of undersea cable, fiber optics, charge coupled devices, solar cells, cellular telephony and many others. And it is the story of thousands of others, men and women, engineers and technicians, who worked tirelessly to transform the inventions of research into technological products and systems to satisfy practical needs.

The book is first and foremost a history. It chronicles the rise and fall of an organization that no longer exists, at least not in the form it once did. It was born in a time and place to which we cannot return, housed within a regulated monopoly and funded by what was essentially a private tax on every phone call made in America. And yet, there is much we can learn from understanding the culture of creativity and innovation that it fostered. For in the end, it was culture that drove the "Idea Factory."

Central to this culture was attracting a critical mass of exceptional talent. In the post-depression era, Bell Labs became a magnet for young scientists and engineers from across the country and it remained so throughout its existence. Each addition increased its draw on the next. Once they were onboard, the Labs provided four things that were essential to their development and success: a sense of mission, real problems, a big picture view, and freedom to follow their inquiries wherever they led.

From its inception, Bell Labs' role was to provide the products and systems that would enable AT&T to achieve its goal of "universal service." This vision, in the words of an early Bell Labs vice president, required that "any two people in the world be able to talk to each other as if they were face to face," and it led to the building of what Shannon called "the most complex machine that man has ever attempted." The challenge of building this machine created what one Bell Labs researcher referred to as "a problem-rich environment" that assured scientists and engineers a never-ending stream of practical problems against which to test their skills. These problems were always set in a holistic context within which whatever piece a particular person was working on fit. There was also an understanding that innovation was unpredictable. Researchers were given considerable flexibility in what they worked on and for how long.

The lessons for defense acquisition are found in this culture. Morry Tanenbaum, AT&T executive vice president at the time of divestiture and the inventor of the silicon transistor much earlier at Bell Labs, saw the roots of the Labs' demise in the very technology that it had invented. By the time of divestiture, this technology had diffused widely throughout the electronics industry and it came back to haunt its creators in the form of competition. In the years since, that technology has further diffused globally, to friend and foe alike. The resulting challenge its ubiquity poses for national security will not be overcome by simply doing what we have always done, only better. It will require innovation, not only in technology, but also in the people that acquire it and the processes they use to do so. This innovation will demand a new culture across the defense acquisition community.