TECHNOLOGY

Incubator of Innovations

Ann Johnson

American Telephone and Telegraph (AT&T) has a long tradition of introducing its newest technologies through carefully staged telephone calls. These exchanges were public relations stunts, and they were performed to demonstrate AT&T's ability to transmit the sound of the human voice through space. In 1876, Alexander Graham Bell famously summoned his assistant Thomas Watson by shouting into the mouthpiece of his invention, "Mr. Watson—come here—I want to see you." He repeated the stunt in 1915, this time sitting in New York and calling Watson in San Francisco, to demonstrate his company's new long-distance transmission capability. In a 1956 performance, Cleo Craig (AT&T chairman), seated in New York, rang up Charles Hill, Britain's postmaster general, in London to introduce a new transatlantic telephone cable. But the most impressive of these stunts was perhaps the 1962 call from Fred Kappel, AT&T president, to U.S. Vice President Lyndon B. Johnson. This transmission, from New Jersey to Washington, D.C., was not impressive for its spanning of geography, but because the signal was sent from New Jersey into space, then conveyed to Washington by the Telstar satellite. AT&T had entered the space age.

Jon Gertner's *The Idea Factory: Bell Labs and the Great Age of American Innovation* asks and answers the question of how Bell Laboratories, both as an institution and as a collection of personalities, made such innovations possible. In the case of Telstar, Gertner (a writer at the *New York Times Magazine*) details the challenges of developing an active satellite. He notes that it "was not one invention but rather a synchronous use of sixteen inventions patented at the Labs over the course of twenty-five years." Only a large firm like Bell Labs, with 13,000 employees at the time of Telstar, could yield so many new technologies, from the transistor to the solar cell, and figure out how to assemble them to interface with the most complex technological system in the world—the telephone system.

Bell Labs's life spanned the whole 20th century, and Gertner describes its beginning, middle, and end. The beginning is important for seeing AT&T's research and development wing as an innovation unto itself. Bell Laboratories was designed to bring cutting-edge science to make phone service better, cheaper, and ubiquitous. Early on, it developed important relationships with universities, and Bell Labs was able to hire some of the brightest young Ph.D. scientists. These academic connections were, in fact, personal. Frank Jewett, head of the Labs at its creation in 1925, had joined AT&T two decades earlier, fresh from physicist Robert Millikan's lab at the University of Chicago. Jewett was able to lure other Millikan students to the Labs, including future leader Mervin Kelly. After Millikan moved on to Caltech in 1921, Jewett recruited electrical engineer John Robinson Pierce and transistor coinventor William Shockley from Pasadena. Gertner is at his best in drawing vivid portraits of these characters, whose idiosyncracies were as notable as their scientific accomplishments.

Whereas the beginning period of Bell Labs focused on bringing scientists into industrial research, the Labs's move from Greenwich Village to Murray Hill, New Jersey, in 1942 generated new modes of interaction. The facilities at Murray Hill were designed to ensure chance encounters: "By intention, everyone would be in one another's way." Scientists, mathematicians, engineers, and technical assistants ran into each other in the hallways, worked in labs and offices together, and ate lunch at the same tables. Ideas were shared as a matter of daily conversation. To be sure, the sociocultural homogeneity of the Labs was a factor in its values; only during the war did AT&T acquiesce to hiring Jews. Women and African-Americans were rare at the Labs and are rarer still in Gertner's depiction. Nevertheless, what was most exceptional was the innovative productivity of the institution in its glory days, when Bell Labs, according to Gertner, "created the future." It is difficult not to share the author's nostalgia for the Labs when seen in light of the remarkable developments of the transistor, pulse code modulation, microwave transmission, the laser and maser, Telstar, fiber optics, and cellular transmission. Moreover, Gertner captures the fun the men he spotlights must have had working on these "wicked problems."

The Idea Factory
Bell Labs and the Great Age of American Innovation
by Jon Gertner
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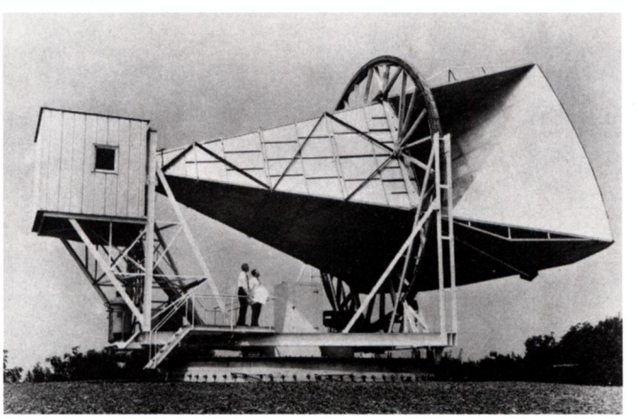

Crawford Hill horn. Built in 1959 for the ECHO satellite experiment, this reflector antenna was modified to work with Telstar. Using it in 1965, Bell Labs physicists Arno Penzias and Robert Woodrow Wilson discovered the cosmic microwave background radiation, work for which they shared a 1978 Nobel Prize.

Gertner, like many others, laments the demise of Bell Labs. He asks where the innovations comparable to those it produced in the 20th century will come from in the 21st. The author gestures at the wicked problems in energy and calls for innovation on par with the Labs's telecommunications inventions. But he also shows the ways in which AT&T's monopoly was both unique and essential to the support of Bell Labs. AT&T was broken up because it stood outside of the logic of the free market. Gertner suggests, probably accurately, that market logic only spurs certain kinds of innovative processes—not "stupendous leaps" but rather progress characterized by "a continuous series of short sprints." However, there might be more hope for solving our wicked problems than Gertner implies. One of Kelly's dictums was to seek good problems, rather than good ideas. Creating an institution for innovation today that learns from but doesn't attempt to replicate Bell Labs seems like the problem at hand.

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