How the valley start-up was invented;
WILLIAM SHOCKLEY DROVE HIS TEAM NUTS

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Fifty years ago this weekend, silicon began its journey to the region that would one day be dubbed "Silicon Valley" in its honor. On Sept. 3, 1955, William Shockley -- the Nobel Prize-winning co-inventor of the transistor who enticed Gordon Moore, Bob Noyce, Eugene Kleiner, and more than a dozen other of the world's top young semiconductor researchers to come to the San Francisco Bay Area to work for him -- signed the contract that launched the valley's first all-silicon research lab-cum-company: Shockley Semiconductor Lab.

Getting a call from Shockley was like "picking up the phone and talking to God," Bob Noyce, co-inventor of the integrated circuit and co-founder (with Moore) of Intel, once recalled.

William Shockley held more than 50 patents for electronic devices and by one estimate was personally responsible for nearly half the worthwhile ideas in solid-state electronics in the field's first dozen years. He chose the Bay Area as the home for his eponymous company because his mother lived in Palo Alto and because the electronics industry -- seeded by World War II and nurtured by Frederick Terman at Stanford -- had already begun to take root in the valley's famously fertile soil.

Two things that would forever be associated with Silicon Valley followed in the wake of Shockley's decision to locate his semiconductor operation in Mountain View. The first, of course, was silicon, the basic ingredient in sand and the second-most-abundant element on Earth, after oxygen. Shockley believed that silicon-based electronics would be more reliable than those built with germanium (then the preferred semiconductor substrate), and he was absolutely right.

An excellent teacher, Shockley gave his handpicked team, whose members previously had almost no experience with silicon, a world-class education in how to handle this temperamental element.

Shockley's second contribution to Silicon Valley was unintentional: His was the first local semiconductor operation to spawn a start-up founded by frustrated employees. In the process, Shockley Semiconductor became the model of how not to run a high-tech company. Shockley was a micromanager -- at one point he specified the types of bolts he wanted on a piece of equipment his staff was building. He also had a hard time deciding whether his goal was to produce outstanding research papers or to sell a product, and he jerked Shockley Lab back and forth between the two objectives with maddening frequency.

In September 1957, a group of eight Shockley Lab employees, tired of their boss's management style and flip-flopping, decided to leave. They went on to found Fairchild Semiconductor, where -- out from under Shockley's thumb but working together in the roles he had designated for them -- they managed to do what Shockley Lab had tried but failed to do: Build silicon transistors and sell them at a profit.

Today it is an unquestioned tenet of high-tech culture that unhappy, talented engineers and researchers will start their own companies at the drop of a hat, but when the eight researchers left Shockley Semiconductor, people were expected to work for a company for their entire careers, earning a gold watch on their 35th anniversary with the firm.

Small wonder, then, that on their last day of work in Mountain View, the young men were called into a room by Shockley's boss, Arnold Beckman, who solemnly read them a statement ending with the warning that the group "should consider the community reaction. This will be looked on as a shameful act."

Shockley never fully recovered from his employees' group resignation. After his semiconductor operation failed, he began teaching at Stanford and espousing increasingly controversial ideas about race and intelligence that would make

him a social pariah. From his outcast perch, he watched his former employees become wealthy and successful as they developed a high-tech work culture marked by open communications, laissez-faire management styles, flat organizational structures, and generous distributions of stock options.

William Shockley would never have wanted to be the source of such innovations, but as "the model of what not to do," he inadvertently was.

IF YOU'RE INTERESTED

The Silicon Valley Archives at Stanford will host a round-table discussion on the "Legacy of Shockley Semiconductor" on Sept. 27, 5:30-7:00 p.m. in the Bender Room of Green Library. Participants will include Julius Blank, James F. Gibbons, Jay Last and Gordon Moore. More information is available at (650) 736-2010.

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