

## SHOCKLEY SEMICONDUCTOR LABORATORIES

*Shockley is certainly one of the most creative men that I've ever known in my life, or hope to. He had a marvelous way of simplifying a problem and getting at the fundamental part of it, cutting away all of the extraneous information and getting a model simple enough to be handled mathematically or experimentally. I think it must be the same working with any really creative individual – the ideas flow so fast that it keeps you busy trying to keep up. Consequently, your rate of learning is very, very high because you are working so hard to understand what is being given to you. This is a characteristic of a good professor at an advanced level.*

*Robert Noyce*

*“Working with Shockley”, January 1966*

At the end of 1954, Shockley spent time at Caltech as a visiting professor while exploring possibilities for his new business. In February 1955, the Los Angeles Chamber of Commerce, where Arnold Beckman was vice president, organized a gala banquet to honor Lee De Forest and Shockley for their scientific contributions. Shockley and Beckman quickly became friends.

Six months later Shockley called Beckman and asked if he would be willing to serve on the board of Shockley's company. After a brief discussion, Beckman realized that he would serve on the board of a company with several persons who were in direct competition with Beckman Instruments Company. Shockley had no business experience and Beckman realized that Shockley's plan had no chance to succeed. Beckman, however, was an excellent businessman and saw immediately a tremendous opportunity. He invited Shockley to Newport Beach to discuss the details for few days.

Shockley envisioned a company for large-scale, high-volume production of silicon semiconductor components – transistors and electronic switches us-

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FOR: BECKMAN INSTRUMENTS, INC.

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FEBRUARY 14 AND FOLLOWING

Beckman Instruments, Inc., yesterday announced the establishment in the Stanford community of the Shockley Semiconductor Laboratory to develop and produce transistors and other semiconductor devices in the field of advanced electronics for automation.

The news was revealed by Dr. Arnold O. Beckman, founder-president of Beckman Instruments at a luncheon for scientists, educators and the press at the Hotel St. Francis.

Headed by Dr. William Shockley, inventor of the junction transistor, as director, the nucleus of the rapidly expanding research team consists of four Ph.D's: G. Smoot Horsley, formerly of Motorola and Bell Laboratories; Leo B. Valdes, formerly of Pacific Semiconductor, Inc., and Bell Laboratories; William W. Happ, formerly of Raytheon Manufacturing Co., and Sylvania Electric Products; and R. V. Jones, who has just completed training at the University of California at Berkeley. The first three are experts in the field of semiconductors, the basic material of transistors which are revolutionizing the electronics field by replacing the vacuum tube. Jones' research work, in a different branch of physics, has direct application to some basic semiconductor problems.

**Fig. 3.1.** Front page of the Beckman Instruments Press Release announcing Shockley Semiconductor Laboratory

ing a solid state diffusion. Bright Beckman realized that such devices might revolutionize the Beckman Instruments Company and he convinced Shockley to abandon his idea of an independent new company and instead set up an organization under the Beckman Company umbrella. By the end of Shockley's visit the Beckman attorney drafted a letter of intent to form a subsidiary of Beckman Instruments: Shockley Semiconductor Laboratories. Shockley assured Beckman that the new company would produce large quantities of semiconductor devices within two years. With a written agreement in hand, Shockley returned to the East Coast and started searching for recruits.

In 1955 the profits of Beckman Instruments surmounted one million dollars for the first time. Beckman swiftly acquired transistor patent licenses from Western Electric and in February 14, 1956 announced in San Francisco the launch of Shockley Semiconductor Laboratories, located in Mountain View, California (Fig. 3.1.)