Abstracts

The Virtues of Nonlinearity--Detection, Frequency Conversion, Parametric Amplification and Harmonic Generation

M.E. Hines. "The Virtues of Nonlinearity--Detection, Frequency Conversion, Parametric Amplification and Harmonic Generation." 1984 Transactions on Microwave Theory and Techniques 32.9 (Sep. 1984 [T-MTT] (Special Centennial Issue Historical Perspectives of Microwave Technology)): 1097-1104.

In the late 1920's when I was 9 and my brother Laurence was 12, he spent his life savings to buy a "crystal set". This was an exceedingly simple radio receiver. It had no tubes, it required no battery, and it had no power cord. It was a black box about 6 x 6 x 2 in. On its top were two tuning knobs, a number of binding posts, and a "crystal." Following instructions, we connected an "aerial," a ground wire, and a pair of earphones. The crystal itself was a piece of rock-like mineral; galena, I believe. It had a polycrystaline multifaceted surface, It was clamped in a metal cup, Facing the crystal was a pointed spring wire mounted in a ball-joint holder, designed so that the point could be placed anywhere on the surface of the crystal and be set to remain there under spring pressure. This was known as the "cat whisker." Again, following instructions, with the earphones in place, Laurence searched for and found a sensitive spot, after many tries. Eureka! He could hear the nearest local radio station, faintly but clearly. We spent many hours with this receiver, not all happy. The crystal contact was erratic and the sound was always faint. We would lose the signal quite frequently, necessitating a search for a new sensitive spot on the crystal.

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