

## Sutton Tube Prototype Un-based, 1940



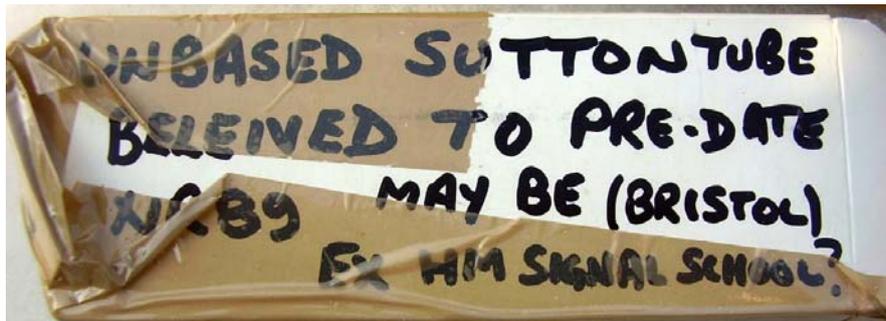
This is a still un-based sample of the very early British S-band klystron. It was developed by R.W. Sutton in 1940, based upon the principles of the devices designed shortly before at Stanford by Varian brothers (\*1). The British design took advantage of the new copper to glass seal process recently developed by GEC at Wembley to connect the external cavity to the deep-drawn internal gap ends. The original Sutton tube was characterized for its concave reflector, almost certainly to improve electron focusing. A GEC CRT gun was used as source of the electron beam. The concave reflector contributed to keep the reflected beam still focused in its way back to the resonator.

According to the inscription on the box, the sample in the collection is believed to come from GEC, directly involved in prototyping these devices (\*2). Likely it is one of the prototypes made at the GEC Hirst Research Laboratories for the Bristol Signal School and used in the painstaking development of a suitable external cavity, with reliable connections and easy tuning. The work led in September 1940 to the first prototypes of 'Sutton tube', giving 10 milliwatts output at 3 GHz. Early samples, complete of tuner, appeared in December. The 'Sutton tube' went in small scale production by EMI and E.K. Cole early in 1941. The collection also includes an extremely rare sample of the original [NR89 - 10E/501](#) complete klystron.

Factory pre-tuned variants of the NR89 were also built in Canada by Rogers for REL. There was a ruggedized klystron family, with large 4-pin base and external aluminum shield. The collection includes samples of the [REL 8C](#) klystron and of its internal bulb. Below photos of the two bulbs in order to appreciate the similarities between the Canadian tube, made by Rogers, and the original Sutton design.



- Comparison of a Canadian REL 8C internal bulb and the 'Sutton tube'. There are only minor differences in the position of the exhaust tube and on the use of two rods to hold the reflector in the Canadian version.



- The box where the 'Sutton tube' was stored.

\*1 - Look at this [Sperry early prototype](#).

\*2 - A Scientist's War, page 79.