New updates, May 2024
*** New historic additions to the collection!

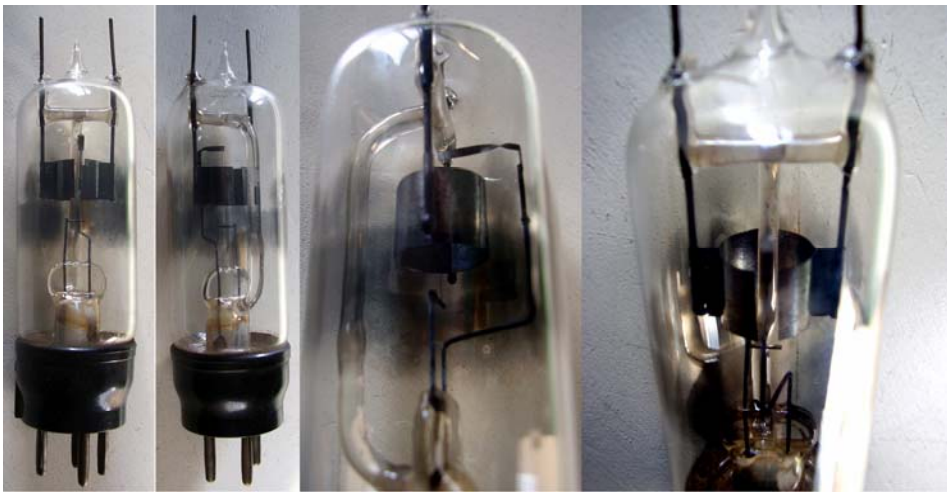
The collection of historic vacuum tubes grows with the addition of new unique samples! Several early magnetrons designed in the 1930s by E.C.S. Megaw, a few miniature samples designed in the 1950s by W.E. Willshaw and an early TWT come from the today dispersed historical collection of the British GEC. Also from the same collection comes an exceptional finding: one of the two 12-segment magnetrons made in France by Henri Gutton for his personal friend Megaw and which deeply influenced the design of the British cavity magnetron and the interdigital magnetrons used in the 1940s microwave communication sets developed by Megaw himself and by Willshaw.

Three more vacuum tubes were found in U.K., coming from the personal collection of a retired ommunication engineer. Two of them are incredibly rare, designed and built for underwater telephone repeaters. The first one is a Western Electric 455A and joins to another sample already in the ASE collection. The second is an almost unknown tube, the British GPO 8P1. The only information found so far, thanks to Danial Stocks, are a couple of papers published in the mid-sixties on Transactions.

One more finding is a nice Raytheon ferrite core memory, likely coming from a flight recorder. Even if not directly related to vacuum tubes, it is a beautiful masterpiece of a computer technology that has now disappeared.

The last exceptional finding is a still intact publication on the proceedings of a conference held in Rome in 1947, on the occasion of the fiftieth anniversary of Marconi's discovery of radio. The weighty volume collects the contributions made by many of the most important researchers of the time, as Randall and Megaw, and also papers on innovative tubes developed during the war, as the 'Resnatron'. Of special interest is the article on the work carried out by Megaw 'An early application of decimetre waves to communication between ships'. The article describes some of the magnetrons recently found.

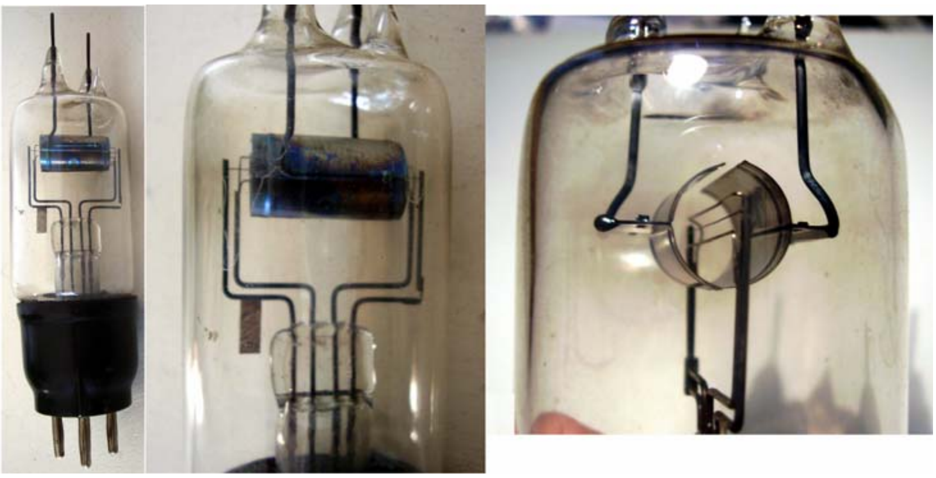
*** Latest findings ***



GEC experimental magnetron No. 1 - Very early prototype with vertical electrodes, short and well spaced anode segments held in place by a complex molded glass frame. Probably the first split anode magnetron used by Megaw for his studies around 1932 or 1933.

Midget split-anode magnetron probably used for early Megaw's experiments around 50 or 25 cm.

Early gridded magnetron, the grid being a spiral wire surrounding the filament. Its vertical electrodes and the use of glass spacers to hold them in place suggest a 1935 design.



One more sample of experimental gridded split-anode magnetron. In this case the grid is formed by two straight wires running parallel to te middle filament. Megaw writes of his experiments on the direct modulation of generated RF in his 1947 paper.

A tiny spit-anode magnetron with internal back loop. It could apparently operate at very high frequencies, probably at 10 cm (3 GHz).

Three GEC 'squirrel cage' magnetron prototypes built during the development of CV79 and CV89, the last two samples in the image. These were used in the Wireless Set No. 10, operating at 7.5 cm. The prototypes could be dated from the late 1940 to 1942. The set, designed by Megaw and Willshaw, became fully operative from 1944.

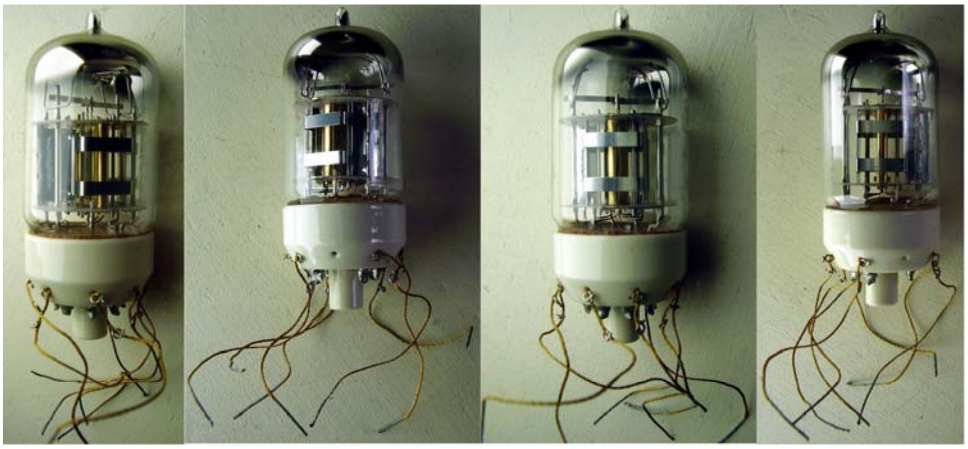
A laboratory sample of the E880/NT75 four-segment magnetron designed for the British Admiralty by Megaw at GEC Wembley. The NT75 was used in the transmitter of a ship-to-ship secure communication set described by the same Megaw in a 1947 paper.

A [second laboratory sample of the E880/NT75] magnetron designed by Megaw for a ship-to-ship secure communication set. Small differences in the filament terminations can be observed compared to the previous sample. About 1937.

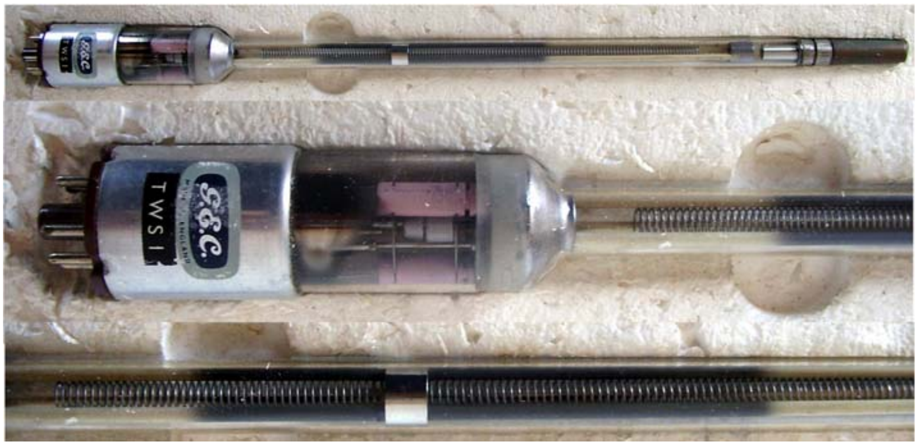
Although similar to the two previous samples, this [E880 prototype] is very different, containing a grid for direct modulation of the generated RF. The grid is a single wire running on a side of the filament. Megaw writes of his comparative studies on this sample in his [1947 paper].

Another finding of exceptional historical interest is one of two CSF 12-segment M-16s, specially modified for Megaw by his personal friend Henri Gutton and brought in the U.K. by Maurice Ponte in May 1940, just as Megaw had started designing his cavity magnetron E1189. We are talking about that E1189 which gave rise to microwave radar and of which ASE preserves the very first 8-cavity laboratory sample ever made. After conducting tests on the two CSF samples just received, Megaw decided to modify his initial design, replacing the thoriated tungsten filament with an oxide-coated unipotential cathode. The preliminary discussions with Gutton and Berline and of the steps that led to the completion of the E1189 design are given by Megaw himself in his 1946 paper 'The high-power pulsed magnetron: a review of early developments'. The design and its implications have been summarized in the article 'The development of eight-cavity E.1198 at GEC'. The influence of Gutton’s work on the E1189 design was recently emphasized in the paper ‘The cavity magnetron: not just a British invention’ by Y. Blanchard, G. Galati and P. van Genderen. In our opinion, almost certainly this sample also influenced the subsequent design of the CW magnetron family used in microwave communication links, the CV79 and the CV89. Our sample with its darkened bulb and its signs of severe use, testifies to the impulsive emission stresses to which its oxide-coated cathode was subjected by the electro-mechanical modulator described by Megaw himself.

Another exceptional finding is this sample of British GPO 8P1 amplifier. It is probably the best amplifier ever designed for submarine repeaters, with extremely long life expectancy and a Gm in excess of 20 mA/V at very low anode voltage, ranging from 50 V down to 30 V. Unfortunately its design, which can be dated around the mid 1960s, came too late to compete with semiconductors and mainly with communication satellites Descriptions of this amplifier can be found on a couple of papers from the IEEE Transactions.



ASE already owned a sample of the [Western Electric 455A](), the ultra-reliable amplifier designed for the bubble repeaters of transoceanic submarine cables. Its observed MTBF is in the order of 50 centuries! This second sample is identified with its GPO code 048/30.



Worth of note this early commercial TWT by GEC, the [TWS-1](), appeared around 1960 as S-band amplifier.

Even if not directly related to vacuum tubes, this ferrite magnetic core memory is a nice example of a computer technology today gone forever. Probably coming from a flight recorder.

[Go to the index of ASE collection of historical tubes]()