

CHAIN HOME TOWER at Great Baddow - Response to case #: 1454834

My interest in this case stems from my family history.

My father Bruce Neale, later to become Chief Engineer at Marconi Radar, was an RAF Warrant Officer in WW2 and worked on CH and later precision bombing aids such as OBOE and GEE. This is how he met my mother, a WAAF Sergeant who initially monitored the CH oscilloscope traces looking for the reflections of incoming German aircraft – some signals which were probably launched from that very RAF Canewdon (now Baddow) tower! Below is the remarkable photograph of my 'to be' parents actually in an Oboe station in 1943 courtesy of Colin Latham's book 'Radar-A wartime Miracle'. I have always regarded myself as a child of Radar!



WAAFs setting up the target and time of bombfall in a UK Oboe station in 1943. In the background is radar mechanic Warrant Officer Bruce Neale. He later married the WAAF Sergeant standing near him, June Vince. There were many successful RAF/WAAF marriages at this period.

The 'CH-The First Operational Radar' article (www.radarpages.co.uk/mob/ch/chainhome.htm) was written by my father for the GEC Journal, a special edition commemorating the 50th anniversary of Robert Watson Watt and Arnold Wilkins' demonstration of the feasibility of detecting radio reflections from aircraft at Weedon, Northamptonshire in 1935. My parents got to know Arnold Wilkins and his wife towards the end of all of their lives. The article has become the reference paper for anybody interested in the CH Radar System and he gave many lectures on the subject.

My father had joined the Marconi Company in the early 1950's when they won the contract for project ROTOR to upgrade the UK WW2 Early Warning Radar Network which included the later versions of CH and he officially retired in 1985 although he continued as a consultant until his death.

For many years the Radar Division occupied the huts and buildings adjacent to the CH Tower at the Marconi Research Laboratories in Great Baddow and you can imagine the surprise that he had as the senior manager at that time when it was reported that there were unauthorised people at the top of the Tower. He went to the base of the Tower and waited for them to descend only to discover that one was his daughter, my sister! She was a computer programmer on the, then new, Marconi Myriad Computers used for Radar signal processing and had taken a dare to climb the tower.

My career started at the Research Laboratory prior to going to University to study Physics in the mid 60's. The breadth of research which took place in Baddow was extensive – I actually worked on the development of gas discharge lasers which had only been invented a few years before and nobody really had any idea about what you could use them for. We experimented with holography that eventually led to the development of 'head up' displays that Marconi Avionics manufactured for US and UK fighter aircraft.

I have travelled all over the world during my career, and much of the business that I was involved in could trace its routes back to the Marconi Research Laboratories and I always knew when I was nearing home when I could see the Tower looming in the distance. An evocative landmark!

For more history on the Marconi Research Laboratories see:

- David Speake's 'A historical Survey of The Marconi Research Centre' The 63 page document is available in 4 sections as downloadable pdfs:
<https://marconiradarhistory.pbworks.com/w/page/35808533/David%20Speake>
- The biography Sir Eric Eastwood FRS, a hugely influential figure in the world of Radar, the Marconi Research Centre and GEC Research:
<https://royalsocietypublishing.org/doi/pdf/10.1098/rsbm.1983.0007>

The Case for listing the CH tower should be further enhanced by considering the following:


Just imagine that there was only one Spitfire left from WW2 that was still recognisable as a Spitfire and that it was in danger of being scrapped for lack of protection as an historical artefact. The Chain Home Radar system around the coast of Britain provided the early warning of approaching enemy aircraft that enabled the Spitfires to scramble and intercept them thus winning the Battle of Britain. Without CH, they could not have succeeded. The CH Transmitter Tower sited at Great Baddow is the only remaining recognisable CH Transmitter Tower in the world and only exists because fortunately it was removed from RAF Canewdon in 1956 and re-erected (retaining its original configuration) to be used for the post war development of Radar, Radio Guidance and Communications systems. If it had not been moved it would have been demolished – instead it found a new purpose which is why it still stands to-day.

Like the Spitfire it surely deserves preservation so that future generations will appreciate the means by which this country was saved from invasion in WW2.

Chelmsford City Council believes it to be of such historical significance that they have erected an information board nearby which is accessible to the public:

THE GREAT BADDOW MAST

Introduction



The Great Baddow Mast was part of Britain's early warning defence network during World War Two. As part of the Home Chain network it was originally built at RAF Canewdon, south-east Essex, detecting German bombers approaching the Thames and London from the north-west. It is one of only two radio masts surviving, and the only complete example in the country. It was relocated to the Great Baddow site in around 1954 and was used for developing radar, radio and telecommunications technologies. The mast is a prominent landmark, visible for many miles. It serves as a strong reminder of the country's World War Two defence, developments in radar and the legacy of the Marconi Company. The mast is of considerable local interest and heritage value.

Radar

In 1935, Hubert Vernon Wall was asked to establish if an intense beam of radio waves could be used to locate an enemy aircraft and its crew. His colleague, Arnold Wilkins, calculated that a massive amount of power would be required and it would have been impossible to achieve it with current technology. However he suggested that radio waves might be able to detect an aircraft. A demonstration established that radio waves would be reflected by an aeroplane and its presence could be detected on the ground. This led to the development of radar, which with refinement, could determine the distance, direction, height and number of approaching objects.


Home Chain Stations

The Home Chain early warning network consisted of 20 sites, from the Isle of Wight up to the north of Scotland. Each site was chosen for its low level, clear coastline and discreet position. Detection was effective to around 120 miles, with a variable frequency, which avoided enemy jamming.

Each site was usually split into two halves, with a transmitter block and three or four short transmitter towers 300ft (110m) high, and a receiver block and four taller receiver towers 240ft (73m) high.

The Home Chain


The Home Chain was a fundamental contributor to the success in the Battle of Britain, allowing approaching German bombers to be detected early and the relatively small number of fighter plane squadrons to be alerted and used effectively.



A special east coast Home Chain station with three short transmitter towers and four taller receiver towers.

Canewdon

The Canewdon site was the fourth to be built in the country between 1937 and 1938. One of its first operational tasks was to track Prime Minister Neville Chamberlain's flight to Munich in September 1938.



The mast is now a prominent landmark and is visible for many miles.

London Legend

Most of the site has been cleared, but parts of the transmitter block and other remnants remain on the site, as well as many old air defences.

When the site was decommissioned in the 1950s one of the masts was relocated to the Marconi Research Centre at Great Baddow.


Great Baddow

The Marconi Research Centre was established between 1937 and 1939. The Art Deco office block was opened in 1939. Other small scale buildings and masts were built for the experimental testing of radio, radar and telecommunications equipment. Various other buildings were built as the site expanded post World War Two, partly through funding for cold war inspired technologies, most significantly the development of the radio guidance system for the British 'Blue Streak' ballistic missile, developed from 1955.

The most significant feature on the site is the mast relocated to Great Baddow in 1954. The transmitter tower is of galvanneal steel lattice construction and is 300ft (110m) tall. There are six cantilevered platforms, at 30ft (10.2m), 200ft (61m) and 300ft (91.5m), which give the tower its distinctive appearance.

The mast was used as part of Marconi's contract to develop more effective air defences during the cold war, and later for the advancement of other radio technologies. It is thought to have formed part of the radar's early warning system against Russian attack in the 1950s, with 27 other upgraded masts from the Home Chain network, while a replacement system was developed.

The mast is one of only two surviving nationally, the only one with its full height and with all its platforms remaining. It is visible for many miles around and acts as a prominent landmark. It holds immense significance as part of the country's World War II defences, due to its later use by Marconi and as a structure familiar to many.



The Blue Streak ballistic missile developed for the cold war, completed from 1955, with a radio guidance system developed by Marconi at Great Baddow.

Places to Visit

- Chelmsford Museum - Salford Mill industrial collection.
- Royal Air Force Air Defence Radar Museum, Northwood, Norfolk (see www.radarmuseum.co.uk)
- Great Baddow Radar Site, Suffolk (see www.baddowradar.org.uk)

Great Baddow Parish Council is so proud of the Tower being in their parish that it has been incorporated into their village sign:



The Tower as an asset to the post war development of Radar, Radio Guidance, and Communication Systems

The **Marconi Company** utilised the Tower from 1956 until they were acquired by BAE Systems in 1999 and the projects for which it was used included:

- In 1955 the Marconi Company won a MoD contract (attributed to Dr. Eastwood) to design a Microwave Guidance system for Blue Streak, the Medium Range intercontinental Ballistic Missile earmarked to carry the UK's nuclear deterrent. The redundant CH Tower was acquired to provide the necessary vertical height for early trials.
- Project Winkle in the late 1950s to develop a passive detection system to locate hostile aircraft equipped with radar jammers to conceal their location. At that time there was a major concern that the USSR could launch a '1000 bomber raid' on the UK, the approach of which would be undetectable by swamping our Radar Chain with high power jamming signals. Winkle proved to be a viable system and became an important component of UK air defence during the cold war.
- *From before WW2, the Marconi Research Centre was the UK's centre of excellence for understanding and predicting radio wave propagation. As a consequence they were chosen to design the original CH transmitter aerial arrays and also to provide an 'ionospheric service' to the military with forecasts for expected HF radio propagation - critical for operational planning. This service was based on the continuous monitoring of the state of the ionosphere from Baddow and was a service that continued well beyond the cold war. Post 1956 work included radio wave propagation modelling and trials for the BBC and ITV prior to the launch of the 625 line UHF television service in the 1960's.*
- Development of Private Mobile Radio Network systems and products – precursors to modern mobile phones.
- Testing of tracker antenna for the Sea Wolf Anti-Aircraft Missile System Mid Life Update programme
- And in support of many other projects, some of which are presented in the previously referenced documents although there may be others which are subject to the Official Secrets Act.

Comment on Historic England Consultation Report of 15 January 2019

Much of what is written in the HE report is also familiar to me either through my own direct experience, through conversations with family and colleagues or access to books, magazines and online resources. I cannot see anything that I know to be in error but I would clarify the statement that '*Under the trade name Marconiphone, the company was also a leading manufacturer of wireless sets for the domestic market.*' In fact Marconi sold the trade name to HMV's holding company the 'Gramophone Company' in 1929 which became EMI in 1931. They continued to manufacture and sell domestic radio receivers under the Marconiphone trademark until 1956 - Marconi ceased their own manufacture in 1929. Marconi's generally avoided being involved in 'mass market activities' concentrating on capital equipment requirements for international business, government and military customers.

Chris Neale FIET 28 January 2019