GLOUCESTER AMATEUR RADIO & ELECTRONICS SOCIETY

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RAGCHEW

FEBRUARY 2022

From the Editor

In the last few weeks we have lost one of the club's stalwart members **Ian G4CLR.** I've managed to trawl back through my photo archive and they demonstrate the enthusiasm with which Ian joined in many of the club activities.

Also in this issue **Tony G4HBV** continues his series **"A Brief History of Radio"** and describes the spanning of the Atlantic Ocean by Marconi, which posed a problem to the scientists of the day as to how this could be possible.

Vernon G0HTO encountered a strange phenomenon whilst reinstating an old VCR recorder and he describes how he tracked down the cause and solved the problem.

In the July 2021 "Ragchew", **Richard M0HNK** described a home-brew step attenuator. I mentioned to Richard that many years ago at a Rally I had purchased a commercial switched attenuator, an **Airmech Type 397**, but had no idea if it was accurate. Richard very kindly offered to test it, and the results are in this issue.

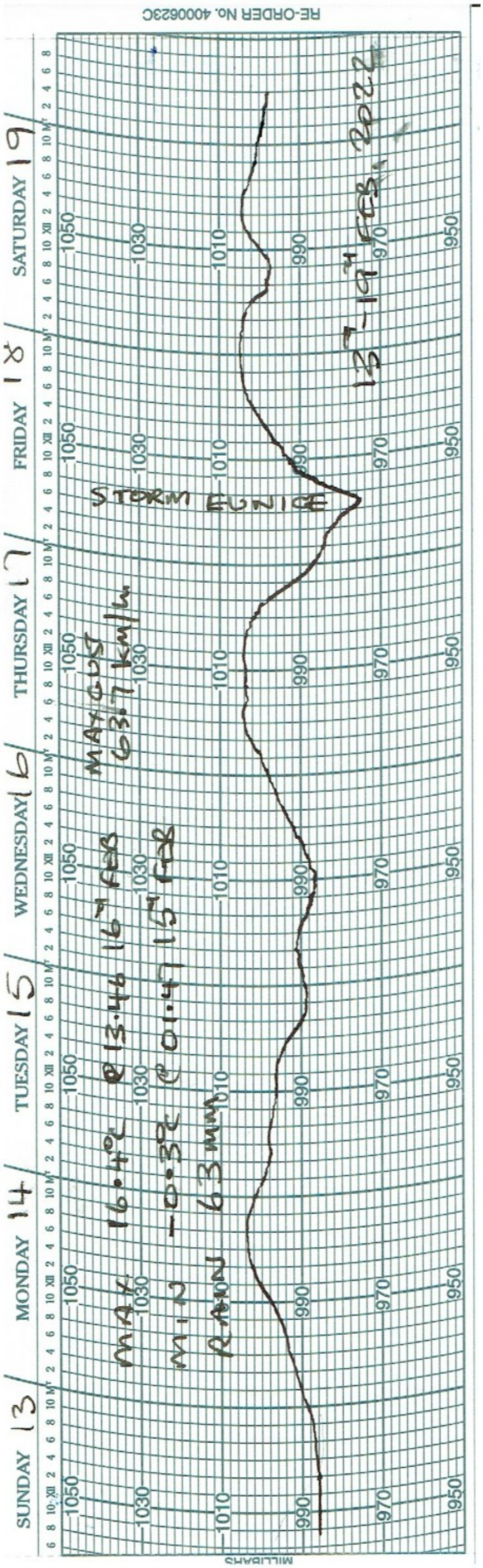
Since reporting the death of **Fred Mills G4XXA** in last November's "Ragchew", early in the New Year we learnt of the loss of Fred's widow **Eileen G4XXB.** Fred and Eileen attended many club meetings in the old St John Ambulance HQ in Heathville Road along with our social events. Latterly, unable to attend club meetings, they became Associate members.

The latest Bulletin of the Lundy Field Society has landed on my desk and scrolling down the Contents page I spotted "Love it or hate it….Wifi on Lundy" Read all about it in this issue.

I'm writing this as Storm Eunice is doing its best to demolish our next-door neighbours car-port. Luckily my HF doublet and 2 metre ground-plane antenna seem to have survived the high winds. For interest I've reproduced my barograph trace for the past week which clearly shows the speed the low pressure system passed through on its trail of destruction.

Best 73 and Stay Safe,

Brian G4CIB



A Brief History of Radio – Part 6
by Tony G4HBV

By 1898 the Marconi Company had succeeded in establishing contact between Chelmsford and Wimereux in France, a distance of 85 miles. Some scientists of the time had believed that radio propagation would be quasi-optical and so of limited use. A distance of 85 miles would not fit into such theories. The quasi-optical behaviour was finally discredited by the Transatlantic test in 1901, when the letter 'S' was transmitted by Fleming from Poldhu in Cornwall to St. Johns, Newfoundland. Transmitter power was 20Kw and the wavelength would have been quite long, determined by the size of the antenna in the crude spark circuit of the time.

At the receiving end at St. Johns, I believe that a tuned receiver (without any gain) was used, but the big antenna that had been intended to be used had blown down in a gale and a receiving antenna was erected using a kite. The distance covered was of the order of 2000 miles and scientists now had to ponder how the signal had travelled over the 140 mile high curvature of the Atlantic Ocean separating the two stations.

In 1902 the scientists, Heaviside and Kennelly postulated that a layer of charged particles (later to be known as the ionosphere) existed in the upper atmosphere and had reflected the signal back down. This was not finally proved until experimental work was carried out by Appleton in 1924.

At the time of the test there existed some disbelief about its success, so in the following year of 1902, the Marconi Company installed a receiver on board a ship, the S.S. Philadelphia and checked the signal strength from Poldhu across the Atlantic Ocean – finally recording a transmission distance of 2099 miles.

Even now, with the probable wavelength of the signal being considered, the propagation remains something of a mystery.

A Peculiar Problem

By Vernon G0HTO

Here's a little story about some RF related fault finding that might amuse “Ragchew” readers.

Over the Christmas break I decided that I would like to have a look at some of my old VHS video recordings and I had been given a recorder that was 'fine when it was last used some years ago'.

I temporarily connected the recorder up to test it and all seemed well - for a few minutes - and then the picture went, leaving a few hazy lines against a grey background. Whilst I was considering possible causes for a couple of minutes the picture came back - perfectly and no more issues occurred before the unit was switched off later that evening.

The following day I convinced myself that it was just 'one of those things', dirt clearing off the heads or similar and I wired up everything more permanently. You guessed it! Every so often the problem returned but I'd hardly have time to think about it before it would clear itself. So I set about trying to find something that would correlate with the fault, such as restarting the tape mechanism, tapping the machine etc.

Eventually I found that if I touched the metal plate on the bottom of the recorder, sometimes this would clear the fault. However, it didn't seem to be a mechanical issue and if an insulating object was used to touch the plate it had no effect at all! I started to think there was 'something RF going on' and that by contacting the plate I was influencing this in some way. (The TV and Video were double insulated i.e. not connected to mains Earth).

The loss of picture (when it occurred) always cleared after about a couple of minutes and I then noticed it always seemed to occur on a 10 minute interval or multiple thereof. Hmmmm, my 200 mW WHSPR transmissions are every 10 minutes and YES it correlated! 200 mW on 7MHz was enough to wipe out the picture! I remember being told about the sensitivity of VCR video replay circuits to some amateur band frequencies, but 200 mW? Upon inspection I found that the VCR top cover and bottom cover were 'sort-of' bonded together and strapped to the circuit board common connection, but that these were poor connections due to oxidation and paint that existed beneath screw heads. When the connections were restored I encountered no further problems.

Lundy Update - Wifi Comes to the Island

By Brian G4CIB

Lundy for many years has been an escape from the modern world. Mobile phone coverage varies from non-existent to extremely poor and for a few years now I’ve relied on using a Lenovo tablet with a SIM card and choosing my spot carefully was able to connect to the internet over the 4g phone network albeit with a very flaky connection. The South Bristol Amateur Radio Club have made many visits to the island activating **GB2BLE** and in 2013 carried out an extensive evaluation of mainland public wi-fi hotspots that could be detectable - see the results here https://www.sbarc.co.uk/club-activities/lundy/lundy-2013/.

The Marisco Tavern on the island has always been a “technology-free” zone - the use of mobile phones, laptops and tablets being frowned on and if used openly the user will incur a £1 fine which benefits the Lundy Pony Fund. A few years ago the rule was partially relaxed and a small room at the rear of the Tavern was set aside for anyone who wished to use such devices.

A major restoration of the island Church was funded by considerable grants and one condition was that the building should provide educational facilities for the many school groups who visit the island. To achieve this, a public internet facility was essential and this has been achieved by installing a 4g router and a directional MiMo antenna adjacent to the Church, which after extensive testing by the installer proved to be the point on the island with the strongest signal. I look forward to using this facility when Leta and I hope to visit the island later this year.

Airmec Attenuator Type 397: Some Basic Tests

Richard Tofts M0HNK. 29/11/21

An image of the device is shown at Figure 1. Just from general appearance and the type of construction one imagines that it might date from somewhere around the 1960s or 1970s era.

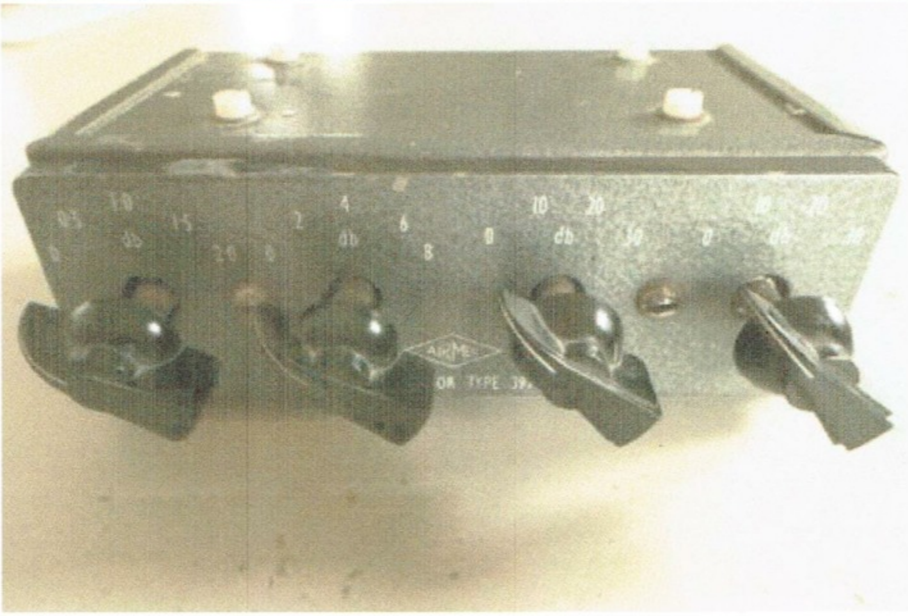


Figure 1: Airmec Attenuator Type 397.

The attenuator is adjustable by means of four rotary switches. From left to right, the levels of attenuation are given as:

Switch 1 – 0, 0.5, 1.0, 1.5 & 2.0 dB
Switch 2 – 0, 2, 4, 6 & 8 dB
Switches 3 and 4 (identical) – 0, 10, 20 & 30 dB

The four switches operate independently and, on this basis, the attenuator provides adjustable attenuation in increments of 0.5 dB from 0 dB to 70 dB.

I have no idea of the power rating of the device. A brief online search for a manual was unsuccessful although my efforts were by no means exhaustive. The attenuator is solidly constructed and one imagines that it might comfortably accept QRP power levels (up to perhaps 10 W). Opening the box to examine the resistors might shed further light on this.

Assessing the performance of the attenuator in terms of its frequency response is straightforward if one has access to a calibrated spectrum analyser (SA) with tracking generator (TG) and this approach was adopted here. The attenuator was inserted between the TG output and SA input and the effect of adjusting the switches was investigated.

The first test was simply to provide an overview. For this, the attenuator was inserted between TG output and SA input and all the attenuator switches were set to bypass (i.e. 0 dB attenuation). The response of the device is shown at Figure 2 overleaf.

Figure 2: Sweep of attenuator in 'bypass mode', from 1 MHz to 1 GHz. The y-axis is marked at 10 dB intervals.

A perfect device would, of course, give rise to a horizontal trace along the top of the screen (i.e. at 0 dB). Figure 2 shows how the Airmec 397 departs from this ideal situation. The level of accuracy deemed acceptable will naturally depend on the job in hand, but measurements taken from this trace indicate that the error is never worse than 3 dB until the frequency reaches 212 MHz. Once the frequency exceeds around 300 MHz the situation deteriorates more markedly. By around 563 MHz the desponse is 10 dB down and the error is as much as 40 dB at around 780 MHz where there is a pronounced notch.

Introduction of varying levels of attenuation produces results that are somewhat complex. Across the HF range (up to 30 MHz) the accuracy of the attenuation was found to be within 0.5 dB of what was anticipated based on the values marked on the front panel. At higher frequencies, the attenuation departed from the ideal flat response, but the shape of the response was generally not simply that of a fixed additional attenuation superimposed on the 'bypass response' of Figure 2. In other words, adding (say) 20 dB of attenuation does not result in a response exactly like that shown in Figure 2 but simply diminished in magnitude by 20 dB. Instead, adding attenuation tends to iron out the bumps in the response to a greater or lesser extent, more so with higher attenuation levels. And at the highest frequencies examined here, the level of attenuation is reduced to less than what it should be in contrast to the situation in 'bypass mode'. Examples of the response from 1 MHz to 1 GHz (like Figure 2) but with 10, 20 and 30 dB added attenuation are shown at Figures 3 to 5. For this, a single switch was used and the others were bypassed, but the results appeared broadly similar if the 30 dB of attenuation consisted of 10 dB on one switch and 20 dB on another. Compare Figures 3 and 5 for contrasting response shapes when 10 dB and 30 dB attenuation are added respectively.

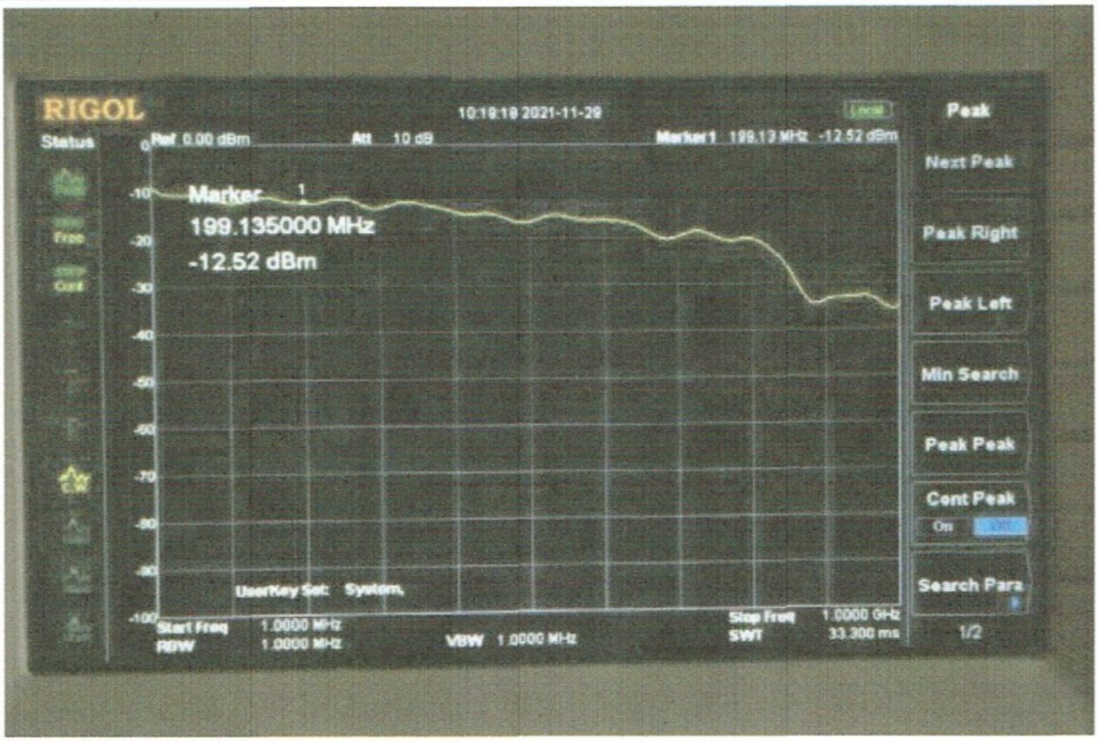


Figure 3: Response of attenuator from 1 MHz to 1 GHz with 10 dB attenuation added.

Figure 4: Response of attenuator from 1 MHz to 1 GHz with 20 dB attenuation added.

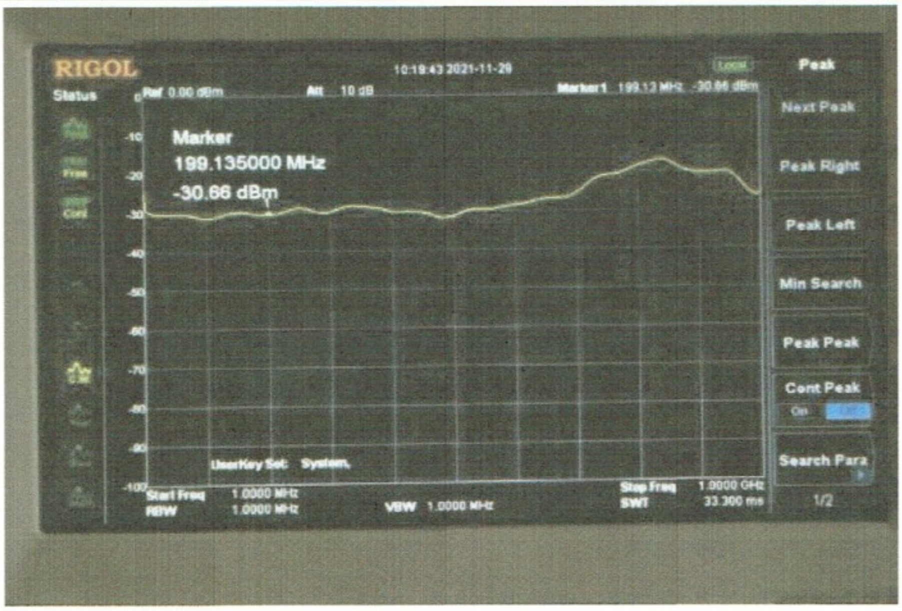


Figure 5: Response of attenuator from 1 MHz to 1 GHz with 30 dB attenuation added.

It seems unlikely that the Airmec 397 attenuator was designed for the highest frequencies used here and it would therefore probably be unfair to criticise it for shortcomings at VHF or UHF. Overall, the tests indicate that the device offers a level of performance that would probably meet most amateur needs at HF and possible a little beyond this, depending on the level of accuracy required. As a final example, Figure 6 shows at a greater level of resolution an example response to 200 MHz with 10 dB of attenuation being inserted into the circuit. The vertical resolution in this case is 2 dB rather than the 10 dB used previously.

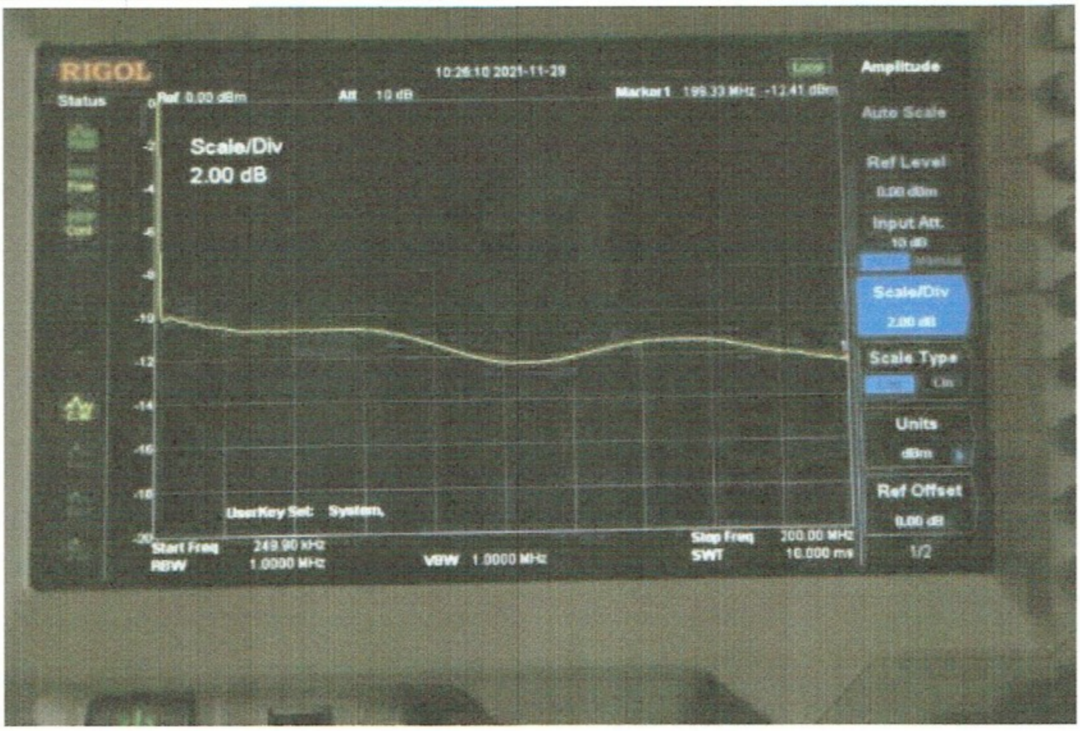


Figure 6: Response of attenuator from 250 kHz to 200 MHz with 10 dB attenuation added. Note that the vertical scale is now 2 dB per division, not 10 dB as in the previous figures.

Ian G4CLR (SK) - A Photographic Tribute

Left: Undated photo c1980, the location is Beechenhurst Picnic Site in the Forest of Dean, where the club held many Picnic and DF Hunts. G4CIB presenting the winning prize to Ian.

Below; This photo is dated 2nd March 1980 when we met at the Drill Hall, Chequers Bridge L-R Maureen (G4CLR XYL), Walter Pearce G8WCP, Helen (G4CLR Harmonic) and G4CIB. With the exception of Walter, not a grey hair in sight.

Below (Left) Robinswood Hill Club Activity Evening on 20th July 1983. A few years ago I quizzed Ian about this photo in particular the rig. It turns out it wasn't his and he was just the operator!

Below (Right) NFD 1981 Gordon League Rugby Ground. Obviously Ian has recently been to a Health and Safety lecture!

All of the photos on this page were taken at the Gordon League Rugby Club, for many years the location of our National Field Day (NFD) station. All these photos were taken at the Rugby Club Summer Fete in 1983. Ian gave a demonstration of a kit assembly and soldering. In the top left photo, behind Ian is Heather (Walter G8WCP's daughter).

Top and middle right: Ian and Maureen enjoying their ice-creams.

In the photo right: Walter Pearce G8WCP, Paul Gait (call sign forgotten I'm afraid) and seated in front of the club tent is Pat G3MA and Stan G3RNU operating the HF station The ginger haired lad standing behind them was a strange chap - whenever we put on special stations in the Gloucester area he would magically appear, not say a lot, then disappear.