



# Chelmsford Amateur Radio Society

Established 1936

Affiliated to the RSGB  
President: Harry Heap G5HF  
Secretary: David Bradley M0BQC

Club Call Sign: G0MWT  
Chairman: John Bowen G8DET  
Treasurer: Brian Thwaites G3CVI

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Web Address: [www.g0mwt.org.uk](http://www.g0mwt.org.uk)

March 2003

## The March Meeting *Practical Wireless* by Rob Mannion G3XFD Tuesday 4th. March, 7-30pm at the MASC

*Practical Wireless* was one of the best known creations of that master of 'cut and paste' editing, the late FJ Camm. He it was who begat the widely read series of 'Practicals'. *PW* dates right back to 1932 and very few magazines can claim such a long and successful life! Known to many unkind wits as Camm's Comics, they were, nevertheless, very popular and avidly read by generations of practical mechanics of various persuasions. FJ was by training a mechanical engineer, his brother Sidney (later Sir Sidney) was the designer of the Hawker Siddeley 'Hurricane' fighter aircraft. The day to day editing was in the hands of radio experts one of whom was Bill Delaney G2FMY, whose son was the famous post-war big-band leader, Eric! (priceless gems of knowledge!). FJC died in 1959 and Edward Molloy, another well known technical editor, also at Newnes, retired soon afterwards, bringing to an end a long and successful era of technical publishing.

The editorship of *PW* was later in the hands of a number of un-named amateurs. Our guest speaker, Rob Mannion took over from Geoff Arnold (G3GSR, I think), and I hope he will forgive me for saying that Geoff was always my favourite *PW* editor! It seemed to me that construction projects reached their peak in those days when a bewildering array of integrated circuits was available for the home constructor. What nostalgia to look back through old issues at the parts and components then available in all the numerous small ads! How things have changed!

### Dates For Your Diary.

March 3 Visit to Waters & Stanton, Hockley  
March 6 Start of Foundation Course

March 4 CARS Meeting.. 7-30pm. MASC.  
March 12 CARS Comm. Mtg DVH 7-30pm.

### Your Club needs YOU!



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The Chelmsford Amateur Radio Society meets at 7-30 pm on the first Tuesday of the month at the Marconi Athletic and Social Club, Beehive Lane, Chelmsford. For details contact our Secretary David M0BQC on 01245-602838.

Club Nets: Tuesdays 8-30pm: (2nd) 145.375 (3rd) 1.947 (4th) 28.325 (5th) 145.375 All +/- QRM.  
Newsletter Editor; Geoff G7KLV, 64 Vicarage Lane, Gt. Baddow, Chelmsford CM2 8HY 01245-473822  
or email: [geoff@g7klv.free-online.co.uk](mailto:geoff@g7klv.free-online.co.uk)

Assistant Newsletter Editor Colin G0TRM 01245-223835 or email: [colinpage@ukgateway.net](mailto:colinpage@ukgateway.net)

## **Last Month's Meeting. VHF & UHF Propagation by Les Barclay G3HTF.**

Once again Les Barclay demonstrated his ability to make a very complex involved subject appear almost as everyday common sense.

He started by reminding us that before the days of radio communication in the 19th century, Maxwell told us that electromagnetic (radio) waves travelled at the same speed as light waves and in 1882 Hertz carried out experiments to show they acted like them as well.

The concept of the isotropic radiator was explained showing us that the field strength of a transmitter in the centre of a sphere had a direct relationship to the power of the transmitter and the portion of the surface that was illuminated. An amusing analogy was used to illustrate that an isotrope was only a theoretical concept to assist calculations and could not exist in reality.

Les asked us to imagine a spherical cat, as the radiation at the surface of the sphere could be likened to short lines on the surface and be represented by the fur, when you now stroke the cat to get its hairs to lay flat and parallel to each other you end up with a tuft where the hairs oppose each other as would the aerial elements they represent.

The pattern gain of an antenna can be calculated using the theoretical sphere to calculate ERP.

(The field strength is seven times the square root of the power divided by the distance) .

Now to Propagation and the conditions to discuss are Reflection Diffraction Refraction and Scatter.

Les says everyone knows that light travels in straight lines and everyone knows that it does not, otherwise behind an obstruction the shadow would be in total darkness.

### **Reflections.**

These occur in radio waves in a similar manner to light, the reflections from the ground between transmitter and receiver have the same down angle to the ground surface as the up angle away. The path length between the direct and the reflected rays however is different and the two signals will arrive with a phase difference. If this is a whole number of wavelengths the resultant will be a 6dB enhancement or in the case of a whole number of half wavelengths no signal at all! It was demonstrated to us that if the distance was changed the signal level would go through these x2 and cancellation states alternately. This would also occur if one or the other stations gradually increased their height and the two signals were brought in and out of phase. Les said that this was a good way to measure the free space gain of the aerials as being the figure between the two. Reflections from other objects were considered. Especially in a room where the signals reflected from the walls ceiling and floor produce complex adding and subtracting areas of enhancement and loss.

(With a hand held on 70 cms. or 144MHz you shift around to find the best position in the pattern of waves and demonstrate this to yourself) Think about a snooker table with the balls bouncing off the cushion and making a crossing pattern of different angles and path lengths.

### **Diffraction.**

Les suggested we examine this aspect by thinking about a wave front as being a parcel of little transmitters one above the other. When obstructed by a wall (say) at ground level those not obstructed above the wall will each have a cardioid forward looking pattern effectively looking over the wall and down towards the ground. These wavelets will combine with their neighbour to enhance or reduce the radiation as the phase difference is brought into play. This effect can be plotted on a diagram for calculation purposes and is in the form of a cornus spiral, from which the field strength at any point beyond the wall or obstruction can be determined fairly well. This all gets very much more involved if the path has more than one obstruction, and more complicated still if the obstruction does not have a knife edge but is a rounded hilltop. However using the spiral and the profile of the path, the field strengths can be determined with reasonable confidence. With this information a fresnel zone pattern can be drawn which shows the clearance required to give service. It is a rugby ball shaped pattern with the TX and RX at the ends (A fresnel zone pattern can be drawn to show reflection clearances and this can be combined with the diffraction one just described).

### **Refractions.**

The refractive index of free air is 1.003 as this is such an inconvenient figure to use, it is multiplied by  $10^6$  to give an index of 300 or thereabouts. The refraction effect on a radio wave transmitted parallel to the earth's surface is to bend it downwards although not enough to overcome the earth's horizon curvature. When planning a radio path it is made easier to consider the curvature of the earth  $\times 4/3$  and the radio wave can then be drawn as a straight line on planning paper made especially for this purpose. Obstructions can be shown on this diagram using separate scale for height, and distance, with the height being the larger scale. With a change of refractive index the signals can bend down to touch the earth surface, these are reflected back rather like HF propagation, but unlike HF propagation a duct may be formed and the over the horizon distance greatly enhanced. Changes in refractive index can be caused by other factors such as sea surface evaporation, anticyclones, radiation cooling and weather front ducting. Changes in index at height can produce ducts, which direct the signal upwards so that the receiver site is under the signal path and out of the ground coverage area for the transmitter.

### **Scatter.**

Les showed a diagram of a typical scatter communication system where high gain aerials at

both the transmitter and receive sites are looking at area of sky mid way between them. They can both see this area but "are over the horizon" to each other. High transmit power is used and the scatter of wavelets in the illuminated area can be "seen" by the receive aerials. Links with this system are used from the mainland to the oilfield sites in the North Sea and for reliable service use quadruple diversity (frequency and space) Typical range is about 150 miles.

The talk concluded with diagram of cell patterns used in planning to avoid mutual interference due to noise, overshoot and frequency reuse.

Thanks Les you made it all sounded so simple and straightforward.

*Report by Tony G4YTG*

## **International Marconi Day Saturday April 26th.**

You might very well ask "Who is that miserable-looking so and so on the front page?"....It is me G3CVI because I must remind you that IMD is only a couple of months away; April 26th to be precise.

Also this year there will be several open days at the Engine House, Sandford Mill. These will be afternoon events lasting for about three hours during which the public will be welcomed and we are invited to provide radio stations as part of the attractions.

The annual IMD event lasts from one hour after midnight on the Friday till "latish" on the Saturday depending on the state of health of the last set of operators and the bands and interest shown by other stations calling. SO, we shall require operators for each of the rigs in use. It would be very desirable to have the main set-up in the hut as usual on HF SSB, the "new rig" on VHF somewhat removed to avoid interference and another rig upstairs working HF CW. This all necessitates a considerable amount of organising, hence the Committee has formed a Sub-committee to arrange things. BUT all will be wasted if YOU do not offer your services as operators. We really would like new less experienced folk to sit with each rig as loggers for a while to get the pace of QSO's and then to swap seats and, still under the watchful eye of the main licensee, to take over the mike and work the world as the calls come in.

At the next Club meetings we shall be reminding you of these events and asking for volunteers without any arm-twisting (yet). The usual stint for IMD is two hours, or more if one is keen, whereas for the half-day events a more flexible system might be desirable. Members of the public are permitted to speak greetings messages into the mike under the control of the licensee and that would undoubtedly be an attraction. No decisions have been taken and we would be pleased to discuss any ideas you have on this matter. Further information will be given in future newsletters, so keep an eye open for same.

## **Foundation News, Trevor M5AKA.**

The Club's 6th Foundation course has just finished.

Congratulations to all those who passed. The next course will be starting on Thursday 6th March. If you know of anyone who is interesting in becoming a Radio Amateur they should contact David M0BQC on 01245 602838 to book a place.

Ever since we ran our 1st Foundation course over a year ago we have been endlessly asked when the Intermediate course will be starting. Well the good news is that the wait is almost over. The Intermediate course will start on Thursday 15th May. Bookings are now being taken and those interested should contact David M0BQC.

The results of the City and Guilds December exams have been published. Nationally 55 candidates sat the NRAE (Intermediate) and 53 passed. 246 candidates took the full RAE out of which 188 passed. This was the last NRAE to be held as it has now been replaced by the new RSGB Intermediate exam. Just two more City and Guilds full RAE exams will take place on the 19th May and 1st December. A question newcomers always ask is what can they work with 10 watts? Mark Bellamy M3BFB has answered that question, anywhere in the world! Mark runs an IC-706 with 10 watts output to a G5RV antenna and he recently worked Cliff ZL4AS in New Zealand. You can't get much further than that! The contact took place on 21.310 MHz at 10:05 UTC Cliff was putting a good 59 signal into the UK and Mark's 10 watts got him a report of 53. Well done Mark it won't be long before you've worked enough countries for DXCC.

I've always considered that 21 MHz is the best band for beginners to start on. A dipole antenna is just 23 feet long and can be made in about 10 minutes. The band isn't too crowded and low power signals go a long way as Mark has proved. So if you've just received your new Foundation licence and are wondering where to start give 21 MHz a try.

## **The Origins of the Club by Trevor M5AKA**

In its time the Chelmsford club has been through several name changes. It started off back in 1936 as the Chelmsford RSGB Group, changed its name to the Chelmsford Amateur Radio Club in about 1957 and then changed again in September 1963 to the Chelmsford Amateur Radio Society. Ron Ferguson G4VF was President of the club under all three of its names from 1952 until 1977 and was our longest serving President.

We only have club documents going back to 1959 but fortunately references to the clubs formation can be found in the 1936 issues of the RSGB "T&R Bulletin" as RadCom was known in those days.

The April 1936 T&R Bulletin had this announcement in the District 14 (Eastern) Section:

"With a view to forming a Chelmsford section [of the RSGB], will members living within 10 miles write to G6LB, Mr. L. Fuller, 85 High Street, Chelmsford promising him their support. If this is obtained a

meeting will be arranged."

It seems the first meeting must have been held towards the end of April although we do not know the exact date and the June 1936 T&R Bulletin carried this short report of the meeting:

"Chelmsford, the first meeting held in this area was organized by G6LB and held at G5RV [*Louis Varney's house in Galleywood Road*] Chelmsford, when an attendance of 26 was recorded, this included a party of 15 from Southend."

James Watt G6ZC first joined the club in its inaugural year of 1936 and although he is unable to attend our meetings as often as he used to he is still kept in touch with the Clubs activities through our Newsletter.

If any club members come across any old Club paperwork prior to 1959 could they get in touch with me. I am also interested in any photo's of Club Members from the 1930's and 1940's.

## **The Dreaded Visit by Dave G3PEN.**

Have you ever had a visit from "The Authorities" regarding your on-air activities? I have, and I wasn't even licensed at the time! The year was 1957, the location was at my school, which was at Buckhurst Hill. In fact, the school was located by the River Roding (in the flood plain!), about half a mile to a mile from Buckhurst Hill itself, which spread along a ridge, parallel to the river.

A school friend and myself were then very interested in electrical physics, and we were allowed a pretty free run of the Senior physics labs, with all the gadgets therein. We decided to explore the realm of very-high voltage physics, following Tesla's ideas, and from small beginnings eventually built the largest Tesla Coil we could manage. This final version stood some 4-5 feet high, using a cardboard tube (ex maps), with a secondary winding of many hundred turns of double-cotton-covered wire, covered by several coats of varnish to improve the insulation, and anti-corona rings at top and bottom. We baked it dry initially with the aid of several bunsen burners - I shudder now at the various fire risks we engaged in!

The primary was a few close-coupled turns of wire, eventually tuned with a very large high-voltage capacitor, made from glass plates and metal sheet. This coil was fed from the largest spark-coil we could find in the lab, powered by a large bank of NIFE cells, and itself producing somewhere around 20 to 25 kilovolts (as estimated by spark length etc.). NIFE cells were famous for the high currents they could provide without damage, and we certainly caned them unmercifully.

Our experiments were undertaken mainly at lunch-time and after school, up to 5 or 6 o'clock at times. We (and our physics master) estimated an output of perhaps a quarter-MegaVolt (!) at best, which is enough to produce streams of beautiful mauve/violet corona-type discharge well over a yard long.

(Until we fitted the anti-corona guards, this simply arced all over the secondary winding - very pretty, but very wasteful).

We tried all the usual things one can do with such high RF voltages, stringing wires all over the lab - when connected to door handles etc. it could scare the h\*\*\* out of casual passers-by, let alone those privileged types we allowed to become part of close-in experiments. The awe when someone found he could light up a large fluorescent-tube by holding it, while also holding his hand near the Tesla secondary winding, was most interesting to see!

Anyhow, one afternoon while trying to improve the set-up still further, we were visited by the head-master himself, with a stranger in tow. We were then introduced to "The GPO Radio Interference Inspector - someone we had vaguely heard of before, but certainly never expected to meet. We learnt, to our horror, that we had been the cause of blotting out the entire long- and medium-wave broadcast reception over several square miles, and especially throughout the whole of Buckhurst Hill. In 1957, TV was relatively limited in use, so the ordinary broadcast radio was the life-blood of the nation, and we had committed the double sin of ruining reception of Mrs Dale's Diary, and Children's Hour! It had taken several weeks to pin us down as the source, so we must have been most unpopular locally.

A veil needs to be drawn over the rest of that visit, and our subsequent interview by the head-master (I don't know what was said to our physics master), but all Tesla experiments ceased forthwith.

Here ended my first visit from "The Authorities"!

### **Bargain Corner 1**

YAESU 6M All Mode Transceiver.

Model FT 690 R II VGC £175

AKD 6M All Mode Transceiver Model 6001

With Repeater Facility & CTCSS Tones.

VGC £75

**Contact Jim Batchelor M1GUS on 01245-320680**

### **Bargain Corner 2**

KENWOOD TS 850sat. c/w 500Hz cw filter. mic, manual etc boxed VGC £525.

KENWOOD TH 26e 2M FM handheld. c/w soft case, hands free mic, car vent, holder, ext dc lead, boxed VGC. £55.

CUSHCRAFT R5 10-20M (inc WARC) vertical antenna £75.

**Contact Dick Baker G4DJC on 01245-256416.**

## **Stop Press.**

**Congratulations to all those involved with organising the Canvey rally and particularly to all the generous donors who contributed towards it's successful generation of an overall profit of £361.75 for Club funds.**