Chelmsford Amateur Radio Society

Established 1936

Affiliated to the RSGB — *Club Call Sign: G0MWT*

President: Harry Heap G5HF — *Chairman: John Bowen G8DET*

Secretary: George Farr G3UTC — *Treasurer: Brian Thwaites G3CVI*

Newsletter No 459 **Web Address: www.g0mwt.org.uk** **April 2004**

This Month's Meeting.
Practical Aerials for the Amateur by Tony G4YTG.
Tuesday April 6th. at 7-30pm at the MASC Beehive Lane.

Last month Alan G3NOQ discussed the theory of aerials and told us about commercial operators and broadcasters who don't have to make compromises about size or height. This month **Tony G4YTG**, a one time professional aerial engineer, will be telling us how we can make the essential compromises necessary for the average small garden. He will deal with the practical aspects of construction, erection and installation for HF and VHF aerials. Members who have heard Tony on his favourite subject before will know that this will be an interesting, informative and enjoyable evening.

As usual we will be holding another of our popular raffles which is being organised this month by Denis M3BIA and Ron M3CAM. Please support them generously.

Dates for Your Diary.

April	6	CARS Mtg. MASC 7-30pm, Practical Aerials, Tony G4YTG.
April	14	CARS Committee Mtg. Danbury Village Hall 7-30pm.
April	20	Aerial Erection for IMD. 9-30pm Sandford Mill.
April	24	International Marconi Day Sandford Mill.

International Marconi Day
Saturday April 24th.

This is our popular operating event of the year, commencing at midnight Friday. We welcome Members who will come along to Sandford Mill for a spot of leisurely operating. We particularly extend a welcome to all our newly licensed Members. Come along and have a go with 100 watts and a really good aerial. Our Station Manager Brian G3CVI will be there to welcome you and introduce you to our latest rig. We operate two stations, the main one in the famous Writtle Hut.

The Mill is open for visitors from 10am 'till 5pm. We also welcome Members who will come along and act as hosts, explaining to the public the fascination of Amateur Radio. See Brian at the next meeting and reserve yourself an operating spot. You can contact him on 01245-471919.

The Club Net Controllers.

April - Harry G5HF May - David M0BQC June – Chris G0IPU

Waters & Stanton Hospitality.

As our older Members will know the Waters & Stanton Open Day is a popular spring event and this year it is on Sunday 30th. May. For the benefit of local clubs they also hold an open evening on Monday 10th.May at 7pm, and CARS Members have been invited. As it is by invitation only please inform Murray G6JYB if you would like to attend so that W & S have some idea of numbers and can cater accordingly.

Please contact Murray on 01245-474969 or mjniman@iee.org as soon as possible.

Last Month's Meeting.
Antennas
by Alan Boswell G3NOQ.

Alan said he thought he should start with a few basics and reminded us that an electric field (E) is found between two plates insulated from each other when a voltage is applied to them. A magnetic field (H) is produced around a conductor when a current flows in it. A plane wave is produced when both fields at right angles to each other propagate into free space where E/H = 377 ohms - the impedance of free space. He then explained, using a slide, with the aid of the Maxwell and Helmholtz equations for E,H and A (Current) that the radiated field distributions could be expressed as the sum of contributions from all current elements in the antenna. He then promised he would not use any more maths in his lecture, bringing a sigh of relief from many of the assembled company!

He then went on to say that the aim of a transmitting aerial was to provide the best possible electric field at the receiver antenna. As the magnetic field falls off rapidly, he explained that the radiation from a conductor carrying current was at right angles to the wire (conductor) with little or none off the ends. Using a spherical aerial concept (isotropic) he explained that the power density at a fixed distance (the surface of the sphere) was the same and equal to $P/4\pi R^2$ where P is the power and R is the radius of the sphere. If all the power is directed to only part of the surface of the sphere, as it would be in a practical antenna, the area of that part compared with the total area is the measure of directivity or gain. For example, half the area, the total gain is 2 and if the area was one twentieth of the total, the gain directivity is 20.

Most practical antennas are electric with a varying current distribution along the length with no current at the end, because there's nowhere for it to go. Magnetic antennas will have the same current flowing around the loop, which must be small compared with the wavelength.

The next subject covered was vertically polarised antennas as used mainly by MW and LW broadcasters where the lossy ground wave is used to provide a small area with reliable and consistent coverage. The service area is determined by the conductivity of the ground and the frequency of the transmission, lower frequency and a better conducting ground giving a greater range. At higher frequencies the losses are high and the range is small. Sea water, being a good conductor will improve the range and CB'ers on 27MHz can work across the English Channel. The navy use vertical whips to work ship to ship at distances not available over land.

As the frequency gets lower it becomes necessary to top load the antenna to keep the masts to a reasonable height and keep radiating current in the vertical section above the conducting ground. This provides an artificial highly conducting ground plane under the antenna, and its top loading capacity, that forms a virtual mirror image antenna under the ground, making a 1/4 vertical act like a 1/2 wave vertical.

While on this subject Alan showed a very impressive computer generated colour slide of the now out of service GBR Rugby antenna, using colours to show the current density in the complex net type capacity on top above the 820 ft. masts which were only there to hold up the net and were not actually part of the antenna.

Using 137kHz as an example a slide was shown comparing the radiation resistance with height. This showed 0.010 (Ohms) at 5m, 0.1 at 20m and 1 at 60 m. He said that you would be very lucky indeed using this band to radiate 1 watt using all the power a 13 Amp socket could provide.

Alan said he thought a few words on receiving antennas would be of interest and said that the high atmospheric noise level from things like the ten thousand thunderstorms that are going on at some point on the globe at any given time produce a 40dB noise at 3Mhz and 150dB at 30kHz. This means that a 40 dB atmospheric noise level above thermal noise with a receiver with a 17dB (say) noise floor could stand a whip antenna with up to 23dB of loss with out in any way degrading the signal to noise. For receiver situations ferrite rod (magnetic small loop compared with wavelength) are very effective and are widely used at MW and VLF

The design principles of a curtain arrays were then discussed. These are widely used for short wave broadcasters such as the VOA. They consist of a phased "curtain" of horizontal dipoles which produce a searchlight like beam of energy in the desired direction. (25 dB at 9 to 18 MHz)

Another directional aerial used by commercial users are the Rhombics with a 4 to 5 to one frequency bandwidth and gains up to 20 dB.

Alan showed a slide illustrating the effects of wire diameter and bandwidth showing clearly that "fat" elements have wider bandwidth and less resistance than the thinner ones. The effect can be simulated in practice by the use of wire cages (sausages) or a spaced pair of conductors which could easily be produced in amateur aerials without too much domestic eyesore hassle.

He thought that Baluns were a good idea and showed us how a field was set up on one side of an unbalanced arrangement between the element and the feeder, producing currents in the feeder outer resulting in unwanted radiation from the feeder and which distort the radiation pattern of the antenna. These factors may be significant

in both amateur beams and the TV aerials likely to be affected with TVI.

A great deal of interest was shown with the beautiful picture published on the net and in the press of the tetrahedral antenna with which Alan had been involved. He explained that it was for HF Radar at 1 to 200 kms distant and about 6m high. It was really an artificially fattened vertical dipole fed between the tetras either side of the centre nylon insulator, which causes a high impedance point at the lower support end and an RF voltage maximum thus requiring an insulator.

Credit was then given to Mr Uda who invented the antenna with which we are all familiar and called the Yagi by most people but only the Uda Yagi by a few. It is probably the most prolific antenna ever designed, with some amateurs in the States with full size 40m versions, with 66ft.elements! Alan gave a neat description of the working by showing three elements spaced from each other, the left one with an inductor in the centre and the right hand one with a capacitor in the centre. The centre one was shown with the AC feed sign, radiation from the centre element was induced in the left inductive element, phase changed so as to oppose the radiation towards it and enhance the radiation towards the centre radiator, thereby acting as a reflector. Also the radiation towards the right hand element was phase changed in the opposite sign so as to assist the radiation acting as a director. The elements are made to look inductive by being a little longer than the resonant length and capacitive by being a little shorter.

Alan had recently been doing some work on small magnetic loops as he says there is little published data and that which is published is confusing and in some cases contradictory. The loop he used was 22mm copper tube, 1m in diameter, with a tuning capacitor at the top and a gamma match at the base. His findings, which he hopes to publish, show the radiation efficiency (which he says is not everything) to be quite low 15% on 10Mhz and only about 5% on 3.5Mhz. He used a 1W source and made sure it was a good match to the feed in the tests.

To conclude his talk he mentioned active receiving antennas, saying the actual antenna element was not so important but the secret was in a very high performance amplifier to match the antenna to the receiver with best possible intermodulation performance. The Navy is now using these antennas with relatively small whips as standard and are known as AVK.

During question time someone asked why we used 50 ohm and 72 ohm feeder as standards. Alan said he thought it might be that the natural impedance at the centre of a half wave dipole was always thought to be about 72 ohms and that for transmitting the inner conductor would be a bit thicker and less lossy at 50 ohms. Technical experts from the floor joined in and an interesting discussion ensued with no definite conclusion being resolved.

This was a very interesting and well presented talk with an insight in to the commercial side of the antenna world accompanied by some super graphic slides to illustrate the facts given. Thanks Alan. You said it was your first visit to us but I am sure we would all appreciate another enjoyable visit in the not too distant future.

Report by Tony G4YTG.

The Mighty Widget. A Cautionary Tale by Dave G3PEN.

I met an amateur (Robin) recently, at the Canvey Rally, who I hadn't seen for many years. Of course, we swapped news about old friends, and he reminded me of a mutual friend, Peter - a SWL in the days when that meant something. I thought that one aspect of Peter's amateur radio career might be of interest to club members, so here goes.

Peter was an avid collector of early radio memorabilia - not radio receivers in enormous wooden boxes (he wasn't allowed the space by his XYL, who didn't like the hobby), but all the small items such as coherers and equipment makers' labels. Even Morse Keys were considered a bit too large by his XYL, he used to say, although he did have a few miniature types from spy sets. Being quite a bit older than me, he had been able to start his collection before WWII, so he had a fairly respectable collection of all sorts of strange items by the time I first knew him, in the early '60s.

Although his memorabilia interests were very wide, he finally specialised in a small item made by some obscure radio company in the early twenties (I can't remember the name), which they called a "Widget" - as shown on a fancy gold-embossed label on each item.

A Widget was a lovely little item, looking a bit like a coherer and about the same size, made mainly in brass and ebonite, and mounted on a plinth or sometimes in a wooden case. The designs varied a lot, as was common in the early days of radio, with manufacturers trying all sorts of changes, either to improve the item, or to appeal to a fickle public, who always wanted the latest design on the market.

Peter first found these Widgets early in his collecting days, and was so taken with them that he tried to get a definitive collection together. I know that he travelled to a lot of rallies from the late '50s on, and he was a keen attendee at the first Dunstable Downs rallies, before they moved to Luton, collecting several nice specimens there.

However, when I last saw him he reckoned that he must have cornered the market in Widgets, because he hadn't found any at all for several years, although his collection now ran to several hundred of these items. Instead of visiting rallies, he was spending most of his spare time repairing and polishing his various collectibles, and researching their histories, with the intention of donating his collection to a suitable radio museum. His problem was that often such items weren't patented, as it cost too much and the designs kept changing anyway, so records were sparse.

What Robin told me was that Peter had become a Silent Key in the early '90s, which, sadly, I'd not been aware of. The worse news was that Peter's XYL had immediately had a house-clean, without consulting any of his radio friends, and his entire collection and paperwork had apparently gone straight into a rubbish bin. (A large one, I'd guess.) This is not an uncommon occurrence - I can think of several such cases locally in the last few years, where only the larger (and therefore apparently more valuable) items were kept for sale.

My advice is -

Please record and value your own collections and equipment, in case your executor is as ignorant as Peter's wife. History may thank you.

There is a post-script of sorts to this - another amateur at Canvey overheard our conversation, and eventually asked us what a Widget was, as he'd never seen or heard of one, although "widget" as a name was familiar to him (it's in the OED, for example). Robin and I had to admit that we were never clear as to the function of Widgets, and together we suddenly realised that possibly no-one would now ever know. Almost certainly, there are no Widgets to be found any more, because probably they had all been in Peter's collection, and are now in a landfill site, somewhere. What a loss to radio history, and what a treasure for future archaeologists!

So, as a final PS - does anyone out there have such a Widget, have you ever seen one, or do you know what a Widget was for? Please let me know.

'Antenna Toolkit' by Joe Carr - A book review by Geoff G7KLV

I came across this book in the library and I have to admit that antennas, or aerials as I prefer to call them, are not one of my favourite subjects! It was the author rather than the subject that attracted my attention. Joe Carr is a prolific author, no longer with us, with a number of titles to his credit and they all have one thing in common, they are essentially practical. A quick glance showed that this book was no exception.

This can only be a somewhat limited review as the accompanying CD was missing, which was a pity. How much it actually adds to the text itself is impossible to say.

The first chapter discusses propagation, the ionosphere, the various layers and ionospheric disturbances. The chapter concludes with a mention of the great circle and how to use the ionosphere for effective communication.

Antenna basics are discussed with reference to the inverse square law, the law of reciprocity, the behaviour of electromagnetic waves, standing wave ratios, gain and directivity and antenna construction.

The following two chapters deal with the two basic types of antenna, the unbalanced Marconi types and the balanced Hertzian types together with their many variations.

Large loop antennas are discussed but small loops are barely mentioned. Another chapter is devoted to wire arrays. Impedance matching warrants a chapter to itself as does antenna instrumentation and measurements. The book concludes with advice on getting a good ground.

I would readily admit that I am no expert on aerials and perhaps not the best person to review a book on this subject but I found it a very readable, more so than other books on antennas I've seen.

Is it worth buying? I'm not sure as I gather the price is £25. Seems a lot, but then good technical books are expensive, as opposed to the myriad of books on cooking and gardening! It is most unfortunate about the missing CD. It might be a good acquisition for our revived library but it's a very good read and certainly worth borrowing from Central Library!

Report from Oldham by Trevor M5AKA

As some of you may know I'm currently working up in Oldham which is just North East of Manchester. I'm staying at the top of a hill just outside the town at about 1400 feet ASL with views over the moors in one direction and Manchester in the other. The lights of the city are quite spectacular at night. The only drawback to being this high up is amount of snow we get and of course the wind.

The local club is the Oldham Amateur Radio Club which, like Chelmsford, was originally formed in 1936 when members paid the then considerable sum of £5 a year subscription plus one shilling (5p) per fortnightly meeting. The club closed during the WW2 and wasn't reformed

again until the early 1970's. These days the subscription is just £10 a year with no charges for the meetings which are now held weekly. They are a large friendly club with just over 80 members and attendance at meetings each week is between 25 and 40.

The club meets in the headquarters of the Royton Air Training Corps and has a well equipped radio hut with separate rooms for the HF and VHF stations. This was formally opened by Practical Wireless editor Rob Mannion G3XFD last October and they are in the processes of putting up 2 new permanent 50ft masts. They are fortunate in being able to use some of the other ATC buildings on the site for formal lectures and training courses, they teach the Foundation as well as ATC Communications courses.

I tried out their HF station a few weeks ago on a sked back down to Chelmsford with Brian G3CVI and Jim 2E1GUA on 80 and 40 metres. Unfortunately the antenna system, a G5RV, didn't seem to be performing too well, I couldn't copy Brian and neither could he copy me although Jim did manage to copy a 41 signal from me on both bands.

One of the main events of the club calendar is the Oldham Rally which by tradition is held on the 3rd Sunday of January making it the first rally of the year. It's held at the Oldham Sports and Leisure Centre and this year was attended by over 41 traders. The rally organiser Hazel Crabtree 2E1WIC and her large team of enthusiastic helpers were hard at work from 6am ensuring the venue was ready for when the traders arrived.

One stall that attracted a lot of interest was Diode Communications (www.diodecomms. co.uk) run by Terry G0TKJ and Tony M0DHC. They were selling the new EcoFlex range of coax cables which are very low loss yet very flexible cables. The smallest cable had a diameter of just 7mm yet had a lower loss than RG-213, the largest had a diameter of 15mm and was usable to 6 GHz yet was extremely flexible. Tony M0DHC was keen to demonstrate that it could be wound into a coil just 20cm across.

The team from Radioworld were there with plenty of bargains and Waters and Stanton made the journey all the way from Essex to put on a large stand. The ever popular Bring and Buy stall was run by members of the neighbouring Rochdale club who run their own rally in the summer.

The rally was brought to a halt at 1:04 pm when the fire alarms sounded throughout the centre. Hundreds of amateurs streamed out of the hall through the fire exits in an orderly fashion and waited outside. Some stall holders carried valuable items with them but other traders stayed in the building to protect their stock. Fire tenders arrived and it was rapidly established that it was a false alarm. People were allowed back in the building after a 10 minute wait and trading continued through the afternoon. As always the rally was well attended and traders reported good business during the day.

Given the name of the town the clubs quarterly newsletter is appropriately entitled "Old Hams News". I understand it was winner of the Practical Wireless Newsletter competition a few years ago and they are keen to repeat the feat.
They have a good website packed with info. about the club, its well worth viewing, set your browser to http://www.oarc.zen.co.uk/

When I first came here I was assured that the stories of it raining all the time in Manchester were an exaggeration. Well I've now been here over a month and I can tell you they were right, it doesn't rain every day – on 3 of the days it snowed instead.

News from Down Devon by Eric G8ADX

Just thought that you might like to know how the other half lives. Having settled into our temporary accommodation in Newton Ferrers, I realised that the day was the first Tuesday of the month and wishing to alleviate the withdrawal from CARS symptoms, I got out the trusty IC2E and with the mag-mount firmly on the car roof, I drove to higher ground near Collaton Cross. This used to be an RAF camp when I did my National Service. I soon broke into a QSO and was advised that Plymouth Radio Club (PRC) was meeting that same night in the Welbeck Manor Hotel at Sparkwell.

I was given a cordial welcome by the 16 or so members attending. It turned out that this was the second meeting of the re-started PRC and was more like a committee meeting, deciding on future events but more imminently the removal of club equipment from store in Plymouth University to make room for a Uni re-hash.
Apparently, as I understand it, sometime in the past, PRC, which claims to be the third oldest club in the country, had failed to form a committee and the club went into "hibernation". Hopefully the "winter" has now passed and the club will start to "blossom".

Apart from the morning "Flakes Net" on 2 metres and meetings every 1st Tuesday, there's something called "Radio Roosters Breakfast Club". Apparently these Saturday morning breakfast meetings, with all the family welcome, are in the cafes of Sainsbury's, Tesco's etc. every 1st Saturday.

Trips are proposed to Norman Lockyer Observatory, Poldhu, Brixham Coastguard and Plymouth Lifeboat etc.

All-in-all, a very pleasant evening with a

great bunch of enthusiasts. Let's hope PRC goes from strength to strength.

What!!!! Aerials again? by Brian G3CVI

Since I was licensed in 1946 I have tried twenty five different wire aerials with variable results. Dipoles, slopers, long wires, inverted V, inverted U, Marconi etc you name it I tried it. Even a home-brew quad for several bands appeared in the garden a few years ago.

Some types were most disappointing and so they should have been because I broke all the "rules" and paid the penalty. BUT the latest effort was a surprise.....I had the sad task of doing a shack clearance for a recently deceased friend and the gear was so big and bulky that it was not possible to get in my shack…....so it was placed on the dining room table with 'er agreement I would add, so I needed a suitable aerial to run the tests.

I placed 33ft of wire at 5ft above ground i.e. a centre-fed 20m half-wave hung from trees and bushes where there was a twig within reach. The wire was in the form of a horizontal V with a right-angle at the apex where the 300 0hm ribbon was attached. The bisector was NW and SE almost exactly and the apex was to the NW. The first contact was to Italy with 5/9+ both ways. Many more followed with none in the NW direction which was not so surprising due to propagation conditions to VE etc. There were very weak signals from broadside directions. The same sorts of directional properties were found on 18MHz but 24 was dead. Even 40m yielded wall-to-wall QRM only an S-point or two down on those from my main aerial down the garden.

Now all this was definitely NOT according to the afore mentioned rules; at 5ft over ground the signals should have just warmed up the atmosphere... or is there something I overlooked when I studied at college?

Got any ideas?

The Revived Club Library

Ron M3CAM, our new Librarian, reports that he was busy at the last meeting. He will be bringing a small and different selection of books to each meeting and he will have a list of all the titles available. If you let him know what you would like to borrow he will see that you get it.

You can catch him on air or ring him on 01245-265739.

Incidentally, Anthony M1FDE has made a link from the Club web page to the library. This gives a list of available books and a search facility; all clever stuff and well worth a visit.

Editorial Thoughts

It was only a few weeks ago that I made a plea for newsletter material and, whether as a result of that or not, I am faced with a deluge!

Up to now I have settled for a two sheet format and often had a struggle to fill it, but from now on I'm taking it as it comes! If there's only enough for one sheet so be it! This time there's enough for three sheets, so from now on flexibility is the policy.

It would be nice if you could send us your comments and let's hear your thoughts. Dare I say it, but a contribution would be even better! We would like to hear more from our newly licensed Members and the recent article from Patrick M3XAP was particularly welcome.

Space Symposium from Trevor M5AKA.

AMSAT-UK will be holding a Space Symposium at the University of Surrey in Guildford (about an hour and a half from Chelmsford) from 30 July - 1 August. This 3 day event attracts amateurs from all over the world provides a unique opportunity to rub shoulders with the designers of the latest Amateur satellites.

As in previous years there will be special beginner's sessions to teach newcomers how to get started in the fascinating world of Amateur Space communications. With some satellites you can communicate using little more than a standard dual-band FM handheld. Most of the astronauts onboard the International Space Station are licensed amateurs and operate 2 metres FM when off duty.

There is an antenna testing range on hand, an opportunity to visit the University's satellite control centre and a bring and by stall. These are just some of the added attractions to the session of lectures on space matters. For newcomers there is a special course on how to get started in space

For more information:
Phone Jim Heck G3WGM on 01258-453959
or email g3wgm@amsat.org
or website www.uk.amsat.org

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