Chelmsford Amateur Radio Society

Established 1936

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

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

Secretary: Martyn M3VAM — *Treasurer: Brian Thwaites G3CVI*

Newsletter No 468 **Web Address: www.g0mwt.org.uk** **February 2005**

This Month's Meeting
Summits on the Air by James M0ZZO
Tuesday February 1st. 7-30pm at the MASC

Contesting is very popular with amateurs and it can vary from the cut throat to the leisurely! Each form has it's enthusiastic followers. This month we are going to hear about SOTA, that is Summits On The Air to you!

This facet of our hobby is a portable / home base radio activity whereby various summits around the country are activated on the radio for participating amateurs to contact from their home station. The location and height are required for contest purposes. There are two types of participant: the activators, the ones that do the climbing (you do not need to be mountaineers though) and the chasers, who remain in the comfort of their nice warm radio shacks!

James M0ZZO will tell you how to get involved and activate summits all quite safely, if you're up to it! He will point all the do's and dont's and suggest suitable equipment for this activity.

Our raffle this month is organised by Denis M3FHA and Ron M3CAM, please support them.

Dates for Your Diary

February	1	CARS Mtg Summits on the Air by James M0ZZO
February	6	South Essex ARS Rally The Paddocks Long Rd. Canvey Is.
February	9	CARS Committee Mtg. Danbury Village Hall 7-30 pm
February	20	Stevenage Radio & Electronics Show, Stevenage.
March	1	CARS Mtg The RSGB QSL Bureau, Marc G0TOC

The Club Net Controllers

February Geoff G3EDM **March Ron M3CAM / Denis M3FHA**

The Canvey Rally, Sunday 6th. February

As usual we will be flying the flag at Canvey and we have hired two tables. There's just one problem! So far we haven't got very much to sell! For the past two or three years this has been a good earner for Club funds. Please have a look and see if you have got anything you don't need.

Colin and I will arrange to collect anything you donate, our phone numbers are below.

The Constructors Competition

Now is the time to decide what you are going to make.
No need for anything complicated, something quite simple is better than nothing.
Short of ideas? Then speak to Carl G3PEM or Dave G3PEN, they'll help you.

Waters & Stanton Open Evening

Monday April 11th. is the W&S Essex Clubs Open Evening - for all Essex Radio clubs.
Numbers must be notified in advance so W&S can handle it. Let me know if you would like to go.
Contact me, Murray, on 01245-474969 or murray.niman@btopenworld.com

CARS meets at 7-30 pm on the first Tuesday of the month at the MASC , Beehive Lane, Chelmsford.
For details contact our Secretary: Martyn M3VAM on 01245-469008
Club Nets: Tuesdays 8-30pm: (2nd) 145.375 : (3rd) 1.947 : (4th) 1.947 : (5th) 145.375. All +/- QRM.
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Please advise changes of address to Geoff G7KLV.

Last Month's Meeting.
The Dreaded Ofcom Proposals by Murray G6JYB.

This was Murray's second presentation of the evening and dealt with the consultative documents recently issued by Ofcom as well as threats from other areas, as Murray said, "if you think International agreements and Primary allocations protect you - forget it".

Murray first of all highlighted an existing threat to our HF bands in the form of Broadband over Power Line (BPL). This provides high-speed Internet access over the existing electricity power lines but they also radiate RF hash across the HF spectrum making our bands unusable. Trial systems have produced noise levels of S9+20 on our 14 MHz band. Murray considered BPL was more likely to make headway in the USA than in the UK with the FCC seemingly not interested in enforcing minimum emission standards. In the UK Southern Electric are using the technology, see http://www.southern-electric.co.uk/broadband/index.asp

ADSL Broadband has been widely adopted in the UK, the current system operates around 570 kHz and causes few problems for amateurs although the 3rd harmonic from the hundreds of thousands of ADSL systems in this country has been received by an amateur on 160 metres from a station located in the middle of the North Sea (a quiet RF location). There is however a higher speed variant called ADSL2+, which actually operates on our 160-metre band and VDSL, which delivers even higher data rates, threatens the rest of the HF spectrum.

These were what Murray described as the traditional threats. Amateur Radio as we know it today now seems to be severely challenged to say the least from it's own regulator Ofcom. Murray pointed out that Ofcom is a very different animal from the old Radio Agency. Ofcom's formation led to around 400 staff losses. These included many former Radio Agency staff, and the Whyteleaf Compliance Centre (EMC Testing). Facilities for the Baldock monitoring centre have also been put out to tender.

Recently the emphasis at Baldock has shifted from checking on interference (spectrum policing/enforcement) to spectrum occupancy, i.e. identifying what spectrum could be sold. Ofcom consultants talk of figures of up to £1 million per annum per megahertz, with the UHF and Microwave bands being of greatest interest.

In the Spectrum Framework Review Ofcom assert the interest in maximum flexibility for the UK and state that almost all agreements are non-binding. In other words, disregard for many established standards and even the International Radio Regulations which are not as binding as you may wish to believe. They consider they can do what they like at UHF and Microwave frequencies since interference to neighbouring countries is regarded as minimal. The aim is for over 60% of the spectrum to become fully tradable, just a commodity to be bought and sold by companies at will. They say it should be simple and transparent for users to change the use of spectrum.

Ofcom proposes total withdrawal from licencing Amateurs, CBers, Maritime and Aeronautical. They regard issuing licences as unwelcome nuisance that brings in little money when compared to the colossal sums they can get by selling the spectrum. From the Amateurs viewpoint this would involve a change from annual renewable licence to an Authority to Transmit with a one off fee. It may well be that the RSGB would take this over this aspect of licencing administration. Ofcom would have withdrawn from CB licencing last July but the small print in Ofcoms contract with the Radio Licencing Centre prevents this until 2006.

Ofcom also don't like the current Amateur licensing structure, which they introduced just 3 years ago and want to "radically simplify access to Amateur licences" whatever that may mean!

The spectrum document advocates a move from 'Command & Control' of the Spectrum to Flexible Spectrum, with new technologies such as Software Defined (Cognitive) Radios and Ultra Wide Band filling the available spectrum more densely. Cognitive radios have the ability to hop anywhere in the spectrum even swapping modes as they hop. Although they check frequency before they transmit they only do so for a few microseconds and if they don't hear any strong signals they transmit. The net effect of this is would be to raise the noise floor in our bands.

Just 3 weeks before Christmas yet another consultation document came out, this one dealt with the next generation of Car Radar systems. This was more like a fait-accompli notification as its proposals were scheduled to take effect from 1st Jan 2005 a full 2 weeks before the end of the consultative period! It proposed that spectrum be allocated for Car Short Range Radar for uses such as parking, pedestrian/crash avoidance, lane control, platooning etc. They proposed allocating a massive 4GHz of spectrum at 79GHz and as an interim measure another 5GHz centred at 24GHz. Ofcom originally stated that nobody used these frequencies despite the fact that Amateurs have primary allocations at both 24 and 79GHz. In addition these bands are used for Astronomical and Meteorological purposes - even the 23.6-24GHz band which where no transmissions are permitted and has Primary Exclusive Passive status is being overridden. It's clear Ofcom hadn't even bothered to read their own frequency allocation tables. After strong protests they hastily withdrew the remark that such frequencies weren't used, but not the original proposal.

Murray stressed the importance of both club and individual responses to these documents and not to hope that 'they would go away' or that the RSGB alone would sort it out. He pointed out that when Ofcom held a consultation on the best use of the old Band 3 TV frequencies they received only few replies from PMR users but got hundreds of responses from DAB enthusiasts, the result was that DAB got most of the available bandwidth in Band 3. If Amateurs fail to

respond to the latest Ofcom document they will suffer the consequences.

It is clear that traditional responses such as emphasising emergency communications (such as in the Asian Tsunami) won't carry enough weight this time and Amateurs will need additional arguments.

A few days after Murray's talk Ofcom released more documents on the Spectrum Implementation Plan (i.e. what's for sale and when), and UltraWideBand which is a new short range wireless networking system covering 3-10GHz (i.e. 3 Amateur bands)

Replies to the Spectrum Framework document need to be in by 15 February and copies can be downloaded from

http://www.essexrepeatergroup.org.uk/

Report by Trevor M5AKA

Digital TV and Radio by Murray G6JYB

Murray started his comprehensive lecture on the switch over from Analogue to Digital Television by stating a few facts about the current take up of digital TV so far, and that current equipment in use may as a result be restricted in its functionality. VCR's (while now old technology) and some DVD recorders may have only the analog receiver, and therefore the ability to record one channel whilst watching another will be lost when DVB-T (Digital Video Broadcasting - Terrestrial) is the only received service. Only newer equipment with digital tuners and the logo shown in Fig.1 will be able to accommodate this. To date there are several ways to get digital TV - these are Digital Terrestrial, Cable, Satellite, and now Broadband (Homechoice).

Fig1

Murray went on to say that Digital Terrestrial Television (DTT) is Freeview (and TopupTV). Freeview is a joint venture between the BBC, CrownCastle and BSkyB, which replaced ITV Digital, and is the common name we have all become accustomed to in the UK. So far the UK is over 50% Digital already, where 7 million have Sky and 5 million on Freeview and that the take up of Freeview is growing at 40000 units a week. There is also another free system proposed via satellite - Freesat for BBC and ITV channels, a non Sky system to cover areas where DTT is unavailable.

The UK is not alone in this Analog to Digital Television switchover. Many countries worldwide are working towards a digital only service, with the UK leading the way in many areas.

Why the change? Digital is more spectrum efficient allowing four times the channel content for one analog channel. However at present analog transmissions are stronger than the lower power interleaved digital Mux's (Multiplexes) which is why coverage is still a little patchy at present. In time with a regional structured analog switch-off, the power levels of Digital will be increased significantly, though not to that of the analog peak power level at present. Also with improved transmission efficiency only two-thirds of the spectrum will be needed for digital terrestrial than that used currently by analogue TV. As to how the remaining third will be used is still to be decided.

Fig.2

It may be released for new services such as for broadcasting interactive services or mobile communications. For example, DVB-Hi-Definition TV (Not to be confused with the Wide Screen formats currently transmitted as standard 16:9 625 lines), or DVB-Handheld.

It is hoped that broadcasters will save on transmission costs (by ending the duplication) and will not have to pay for upgrading the present analogue transmitters which would need major investments to keep running saving millions of pounds.

Murray went on to explain the six Multiplexes and their content and that Ofcom has recently designated Mux 1, 2, B as Public Service Broadcast (PSB) multiplexes meaning Channel 5 may need to move as part of the Switchover. Public Service Broadcasts must be maintained and given priority during the switchover so that the population has access to at least one PSB channel whether Analogue or Digital. At present Freeview is currently on 80 transmitters at low power across the UK. The plan is that all 1154 transmitters will carry at least the three Public Service Broadcast (PSB) Muxes 1, 2, B. There are 130 relays where it is hoped they will have all 6 Muxes but many of the relays will only have 3 PSB Muxes.

Mux-1 (BBC)	**Mux-2**	**Mux-A (SDN)**	**Mux-B (BBC)**	**Mux-C**	**Mux-D**
BBC-1	ITV-1,2,3	Five (Ch5)	BBC-4/Cbeebies	UK History	TMF
BBC-2	ITV-News	QVC	BBCi V'o(701/2)	Sky News	The Hits
BBC-3/CBBC	CH4, More-4	Bidup,PriceDrop	BBC Parl't	Sky P'ptss News	FTN/UKBr' ideas
BBC-News24	E4 ?	abc1(plus TopupTV)	Community	Sky Travel	I World +20 rad

How this looks in our area where Crystal Palace and Croydon (Ch5) have at present analogue powers of 1MW Peak, and Digital power levels are 20kW (17dB down) Raising digital powers further would start to interfere with analogue services. So the plan is to close the Analogue system, channel by channel, moving the corresponding digital Mux (carrying the closed analogue channel) to the now vacant Analogue frequencies that

have international clearance for high power. This means that digital powers can be rased to within 6-10dB of current analogue peaks giving better, stronger coverage (100-250kW, compared to 20kW at present)

So what will be gained by all this moving? The goal is free common spectrum across the UK. Analogue UHF TV has 48 x 8MHz channels in Band IV 470-598MHz & Band V 598-854MHz making a total of 384MHz bandwidth. The plan is to release 14 UHF channels 14 x 8 MHz = 112MHz. This is then available for re-issuing for other services. The upper UHF channels are adjacent to 2G Mobile Phones perhaps 3G in future. But all this is subject to confirmation at Europe Conference in time.

So when will this all happen? Planning started years ago with a group called 'The Digital Television Project' in DCMS and will occur on a phased region by region basis. Each TV Region will be given a 2 year warning, then phased switchover over 6 months, probably starting with BBC2. The first region is to be switched is likely to be the Border/Tyne Tees TV region starting around 2007. The Government has not officially confirmed the start date, but their agents have set the backstop deadline of Dec-31 2012. Ofcom has issued Digital Replacement Licences to all broadcasters which oblige them to be Digital Only by this date. To promote the digital age of TV a company formed by Ofcom called SwitchCo along with huge PR budget will make all the population aware of the changes.

Will this be a smooth transition from Analogue to Digital? In Wales one area has already switched. Ferryside started its trials in November 2004 where a local relay for 250 homes converted to digital only as a test bed to asses problems. Free Digital boxes where given to assess how well householders can install use, record their viewing. For Ferryside it seems good so far, and Analogue transmissions will end in February 2005.

Murray then went on to talk about Enhanced or Hi-Definition using 720 or 1080 lines and requiring more bandwidth. This as stated earlier is not what Freeview is transmitting. The most likely method for Hi-Definition TV will be by Satellite & Cable due to the Bandwidth needed for the services. The BBC has asked for use of released Spectrum for Hi-Definition and only time will tell if the freed up spectrum will be allocated for this.

Next Murray considered equipment issues. He pointed out that Sky intend to start a Hi-Definition TV system in 2006 that will be encrypted using a signal on new interconnects (HDPCI) so many new widescreen and flat panel TVs with Scart-only connections may be incompatible as they have no raw video input connections. DVD Disks will be superseded by a new system "Bluray" or HD-DVD soon utilising a cartridge based disk that will also be Hi-Definition TV. On the recording side of things Murray indicated the way forward was in Disc based systems either DVD or Hard Drive. Some Freeview boxes feature hard drives as a method of time shifting the program you are watching, this is also available on Sky+ set top box's.

One important issue that remains for the reception of DTT is the aerial, coax and connectors that should be used. Only certain aerials are approved for DTT look for Logo (Fig3) from the Confederation of Aerial Industries (CAI). These Aerials have the necessary bandwidth and gain and when used with approved foil-screened CT125 coax and connectors make for a reliable Digital TV receiving system. Coaxial fly leads should conform to BS EN 60966-2-4:1997. Poorer quality / old aerial systems may have the wrong group aerial and lossy coax resulting in reduced signal and bandwidth leading to pixellation on the wanted picture and squawky sound bursts from impulse interference.

Fig.3

Murray concluded the TV switchover talk by reminding us to think about digital switchover today, as it will affect the lifetime of any new TV or video recorder that you buy now. New equipment only qualifies for the Logo (fig1) if it is 2K/8K carrier compatible. The older ITV Digital boxes do not qualify as they were 2000 carrier only. Modern equipment has a 8000 carrier COFDM receiver (eg for better interference immunity, SFN (Single Frequency Network) TV relays)

In short "Switch to Digital before you get Switched Off !"

As a natural addition to the subject of digital TV Murray then brought us up to date with the Digital Radio including DRM (the digital equivalent of AM still in its infancy) saying that the UK DAB coverage significantly improved over the last 12 months. At his home the received DAB (Digital Audio Broadcasting – replacement for FM Analogue) Multiplexes now include the Kent local radio stations as well as London. This is mainly due to his good aerial system allowing him to receive a mix of over 50 local and national radio stations.

DAB
Digital Audio Broadcasting

digital radio

drm

The current Multiplexes are between 218MHz and 229MHz (11B to 12D Multiplexe Designations) with 11D and 12B carrying National Multiplexes (BBC / Commercial) and if you were mobile you would not need to retune as your journey up the country as these are Single Frequency Networks (SFN). To accommodate new additions to the system more spectrum is proposed in frequency blocks 209MHz (10A) to 217MHz (11A). This could include an Electronic Program Guide (EPG) with graphical information as well. And the BBC has also submitted a requested extra space; this would allow them bandwidth for better quality transmissions.

11B	**11C**	**11D**	**12A**	**12B**	**12C**	**12D**
DAB Local L'don DRG	DAB Local Kent	Nat. Com'l	DAB Local L'don Sw'h	BBC Nat'l	DAB Local London CE	DAB Local Essex

When purchasing equipment shop around as DAB radio prices are dropping and check DAB specifications for frequency band coverage as there is all of Band III, not just UK allocation, making it usable worldwide and not

just the UK. Does it support L-Band ? (there is no UK DAB service at present 1452-1490 MHz). While not critical it may have some use. Also in L-Band is the "World Space" satellite radio system (now largely a subscriber system on 1467-1492 MHz – some un-encrypted radio stations may still be there). Another feature to look for is if its firmware can be updated (as some have USB ports) and with internet access from the manufacturer, as this may prolong the specification of the Equipment. This would allow future Electronic Program Guides (EPG) similar to the TV guides in concept and graphical software updates and any encoding changes to be accommodated. Some sets may even have MP3 players and allow Pause/Record/Playback of live radio broadcasts.

Murray indicated that the BBC has suggested to start preparations for a Radio Switchover that will be reviewed in 2008. Despite all this digital revaluation there will still be a perceived need for the old AM system on Long Wave as Radio 4 is a Public Service Broadcast (PSB) and would need to be available for National Emergencies and of course – the shipping forecast.

To conclude this section of Murray's extensive and comprehensive lecture on the switch over from Analogue to Digital Television along with the DAB and DRM questions were invited from the floor. Most were of a reception nature, specific to the questioners. Murray responded by saying that as time goes by all the digital networks will get stronger as the older analogue services fade into the history books.

It was clear to see that Murray had done a lot of research for the talk and these few paragraphs while giving an overview of the talk do lack the graphical input that made for a well presented evening. Murray's slides in Powerpoint format are available from the Club's web site. Do have a look.

Thank you Murray for the evening's presentations and the slide set for this write-up.

Report by Christopher G0IPU

Peter Naish G3EIX & VK2BPN SK
Recollections by Geoff G3EDM/VK3EDM

As my callsign (G3EDM) indicates I was licensed about the same time as Peter, although possibly slightly before because my licence was issued ahead of the then current issues. My first contact was with Peter from his home in Danbury when I was driving between Langdon Hills and Billericay. It was on 160m AM on 2 August 1964. I moved to within a 1km, of his QTH in 1972 but by that time he had left Marconis and Danbury to work in Sydney, NSW from his home in a suburb called Epping, about 30 minutes drive from downtown Sydney. Peter leaves his wife Monica and daughters, Elizabeth and Louise. Louise followed him into communication engineering; a career in which it was difficult for a young lady to enter even ten years ago in Australia. When I was in the Sydney area I always visited his home, where he had an excellent HF station. The last time I spoke to him on air was on 20m SSB when he was operating the SSB Wireless Institute station VK2IMD on IMD. Only a few days ago I found a photograph of his shack in Epping on my computer taken on 13th February 1983! It must have been about the time that he died in the Sydney hospital on the 9th January 2005, when I found the photo. Of course, he knew Louis Varney G5RV well and a photograph on the CARS website shows a much younger Peter and Louis operating GB2CRA. Around 1980 Elizabeth stayed with us in Danbury and we took her to see St. Peters hospital in Maldon where she was born. Peter's parents lived in the West Country at that time, so we took her to see the London tourist spots. When working for his Australian communication company he frequently flew to Europe for meetings and I asked him how he managed to go straight to a meeting after a 21 hours flight from Sydney. His answer was to get a sleeping drug prescription from his GP and then hang a notice around his neck asking the cabin crew not to disturb him! That was before we knew about DVT (Deep Vein Thrombosis)

Peter was an excellent CW operator and when he was the regional representative for this area he visited the Basildon Club's field day site (Only low power CW 10 Watts). He operated for CARS on NFD on a number of occasions in Danbury Park and Howletts Farm, Writtle.

Peter, like some other CARS Members, became President of the RSGB and later President of its Australian counterpart, the WIA. He was the Secretary of WIA and attended a number of international ham radio meetings to try and ensure the hobby survives. A year or two ago he fortuitously came across the CARS website and I recall John, G8DET, seeking information for Peter.

Above all Peter was the true amateur as well as a professional engineer and always a gentleman.

Two Lead Marconi Antenna
by Patrick 2E0XAP

Essentially the antenna is 19.47m of 300-ohm heavy, laddered twin feeder. One end is soundly soldered together, with a dog-bone (black-ribbed if you prefer) insulator threaded on to one side first. No resistor or capacitor, just a good sound dead short mechanically strong enough to swing on. Insulate it with tape, then move the insulator over to act as a suspension point. The other end is connected to a cheapo PL259 plug; you'll need an 80w soldering iron. Then solder the inner of the PL259 to the other side of the twin feed. Let it cool, then tape the plug assembly so's to prevent the ingress of water but, again, without compromising the screw-up collar.

Ideally the PL259 end should be down the far end of the garden. Organise yourself 2 lightning arrestors, the usual £19.50 or so variety, 2 earthing spikes or more if you can afford it, and some 'modern(!)' 10mm dia water pipe from a DIY

emporium, at least 20m or better, enough to get the earth connection we're going to discuss up to the back door passing under the lawn/flower beds. One earthing spike goes here, the other down the far end where the antenna connects. Oh, and don't forget 20m+ of RG213 coax and waterproof, screw-up PL259's for outdoors.

Select your far earthing point, bearing in mind that the lead from laddered feeder to earth needs to be AS SHORT AS POSSIBLE. Bang in the first earthing spike where it's ok & safe to do so. Cut about 3 inches off the 10mm pipe and bash each end flat...about an inch. Holding it in a vice, carefully drill 5/16th dia holes in bashed-flat bits. Use one hole to bolt to the earthing spike and the other to the lightning arrestor. You can bend the pipe to allow the bolt on the arrestor to be dependent if you wish. The other side of the arrestor connects to a PL259 which is then connected to RG213 for your signal; this goes up to the house and terminates there at the second arrester spike arrangement, and thence into the house via a second run of RG213. Be careful not to hole the house main water/drainage!

[NOTE: Some spikes have 3/8ths dia holes; you'll need to split the pipe and flatten it out as a single layer to get the width to take the 3/8 dia. hole.]

Where my setup differs is that the 2 spikes are connected by the 10mm dia copper water pipe under the lawn, flower beds etc so that there is a species of earth/counterpoise formed.

You'll appreciate that this pipe earth and the coax are in parallel. The pipe connections are the same: ends bashed flat, drilled and bolted. Use brass bolts if at all possible to avoid making a battery which will dissolve your handiwork! (Now you know why some folk replace their radiators every 4 years or so.) To take the pipe under the lawn, use a heavy carving knife to make a slit and push the pipe into it. Looks awful; it'll start to disappear in a week or two and you won't notice it after 2 months or so. The carving knife comes out bright and clean.

Suspend the dog-bone end high; I'm limited to 9m. The other end keep as high as poss but the last few metres need of course to come down to the first arrestor. Tie the ladder about 30cm up from the connecter to the connector to avoid strain on the PL259, then suspend the rest as high as you can get it. Ideally the whole will slope down to the PL259 connection.

[1] The antenna has an impedance of about 73-75 ohms which is a lot better than a long wire, and allows a reasonable coax match.

[2] The coax can thus go right up to the ATU in the shack, so you don't have RF bouncing around therein. [You COULD try an ATU at the PL259 end of course!]

[3] I hope I don't have to extol the merits of lightning arrestors!

[4] The overall message re earths is that small gardens require big ones.

This antenna WILL NOT WORK without a substantial earth. [Currently I'm using the half-G5RV strapped as a capacitively-loaded device on top band, tuned against this earth.]

This antenna resonates on 80m, and will tune up with an ATU right up to 10m. I discovered that it will also resonate on 17m and also on 12m. By accident I found that one can get out in a limited fashion on 160m, but watch your SWR. I have not tried it on 6m. [It complements my half-size G5RV; I can use the G5 on the second RF output, the one without the internal tuner, on my TS570-D; the first RF output has the ATU and this antenna I've described.] Note that the internal tuner the Kenwood has is fine, but won't cure all mismatching ills!

The design for the antenna was described in Joe Carr's Antenna Handbook which is available from the RSGB. It is also in the CARS Library

Ten Commandments of Electrical Safety

(culled originally from the Journal of the Rutherford Laboratory)

1. Beware of the lightning that lurks in an undischarged capacitor, lest it cause thee to be bounced upon thy backside in a most ungentlemanly manner.

2. Cause thou the switch that supplies large quantities of juice to be opened and thusly tagged, that thy days may be long on this earthly vale of tears.

3. Prove well to thyself that all circuits that radiateth and upon which thou workest are grounded lest they lift you to high-frequency potential and cause thee to radiate also.

4. Take care that thou useth the proper method when thou taketh the measure of high-voltage circuits so that thou doth not incinerate both thee and thy meter, for verily though thou hast no part number and can be easily replaced, the meter doth have one and as a consequence bringeth much woe on the supply department.

5. Tarry thee not among those who engage in intentional shocks for they are surely non-believers and are not long for this world.

6. Take care that thou tampereth not with interlocks and safety devices, for this incurreth the wrath of thy seniors and bringeth the fury of the safety officer down upon thy head and shoulders.

7. Work thee not upon energised equipment, for if thou doeth, thy mates will surely be buying beers without thee and thy space at the bar will be filled by another.

8. Verily, verily I say unto thee, never service high-voltage equipment alone, for electric cooking is a slothful process and thou might sizzle in thine own fat for hours before thy Maker sees fit to end thy misery and drag thee into his fold.

9. Trifle thee not with radioactive tubes and substances lest thou commence to glow in the dark like unto a lightning bug.

10. Commit thee to memory the works of the prophets, which are written in the instruction books, which giveth the straight info and which consoleth thee, and thou cannot make mistakes.

Thank you Trevor for that little gem!