CPREC

G2LW

Palace Pulse

The newsletter of the

Crystal Palace Radio & Electronics Club

Affiliated to the Radio Society of Great Britain

Established January 1956

Meetings are held on the first Friday of each month.
The room opens at 7:30pm for an 8pm start at:
All Saints Parish Church,
Beulah Hill, London, SE19 3LG
(opposite the junction with Grange Road).
Visitors are always welcome.

Web sites:	Club Admin:	http://cprec.btck.co.uk/
	Club Technical:	http://cprec.btck.co.uk/OurTechnicalSite
Email:	cprec.g2lw@gmail.com	
Club Net:	Each Wednesday at 20:00 on FM on 145.525MHz (S21) ± QRM Experimental net each Saturday at 20:00 on FM on 51.55MHz	
Twitter	@BobFBurns or www.twitter.com/bobfburns	

Next meeting: Friday 7th February 2020

Annual General Meeting

In this issue: *Future Meetings & Events, Recent Event News, The Biggest Picture by 'Theorist', Technical Snippets, Members News, Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, AGM Agenda, Local Training Courses and Club Contact Information.*

See the page 9 for local training courses and club contact information

Dear Reader

Future 2020 Club Meetings and Events

07 Feb	M	Annual General Meeting
06 Mar	M	Practical Fault Finding by Martin Butler M1MRB
03 Apr	M	DMR Hotspots by Damien 2E0EUI
01 May	M	S Parameters, SmithCharts and a cheap Vector Network Analyser by Alan G8NKM
05 Jun	M	TBA
03 Jul	M	Valve Technology by Bob G3OOU
07 Aug	M	Summer Social

C = Contest, CM = Committee meeting, E = External event, M = club meeting, R = Rally, T = Training course, V = Visit.

07 Feb 2020 - Annual General Meeting

The next club meeting will be our Annual General Meeting for which an agenda and Officer's reports are included on the last three pages of members only copies of this newsletter - please bring them to the meeting.

Visitors are always welcome but only paid up members may vote at this meeting as is defined in our Constitution.

Recent Event News

03 Jan 2020 - Video Evening

Alan commenced the evening with a short presentation on lighting and power distribution and the problems and benefits of using direct current versus alternating current.

Circa 1880 Edison in the US and Swan in the UK both developed incandescant light bulbs (of somewhat dubious reliability) and saw this product as a means of making a fortune if electricity could be widely distributed. In the US electrivity was distributed as 110V DC but only useful for a distance of about one mile before the losses became too high. Arc lamps using 3KV AC were used in large buildings and factories.

Westinghouse became interested in the manufacture of transformers first developed by William Stanley using ideas gained from a European publication and seen as a way around certain patents taken out by Edison. Some London networks continued to use DC mains until the 1970s.

The Tesla Electric Company designed a polyphase induction motor which ran on AC for which Tesla and Westinghouse engineers chose 60Hz in order to get the required rotation speed. Three phase motors are better for machine tools and have a much reduced inrush current at switch on.

Today the standard household mains voltages are 230V in the UK and 115V in the US. Resistive losses in the transmission cables mean that it is much more efficient to distribute energy over long distances in the form of very high voltage and relatively lower current. However, some mains supply links across the Channel use 800-1000v DC to avoid phasing problems between countries.

The wavelength of a 50Hz signal is approximately 5995Km so it is possible to get resonance problems with very long distance distribution paths of the AC mains. The skin effect depth of a single conductor at 50Hz is 9220µm.

Alan finished by showing two humerous videos by a Youtuber called ElectroBOOM demonstrating energy transmission issues together with what to do and not do in handling high voltages and one much more serious video of the catastrophic effects of failures in high voltage transformers. You can see the three videos at:

https://www.youtube.com/watch?v=quABfe4Ev3s

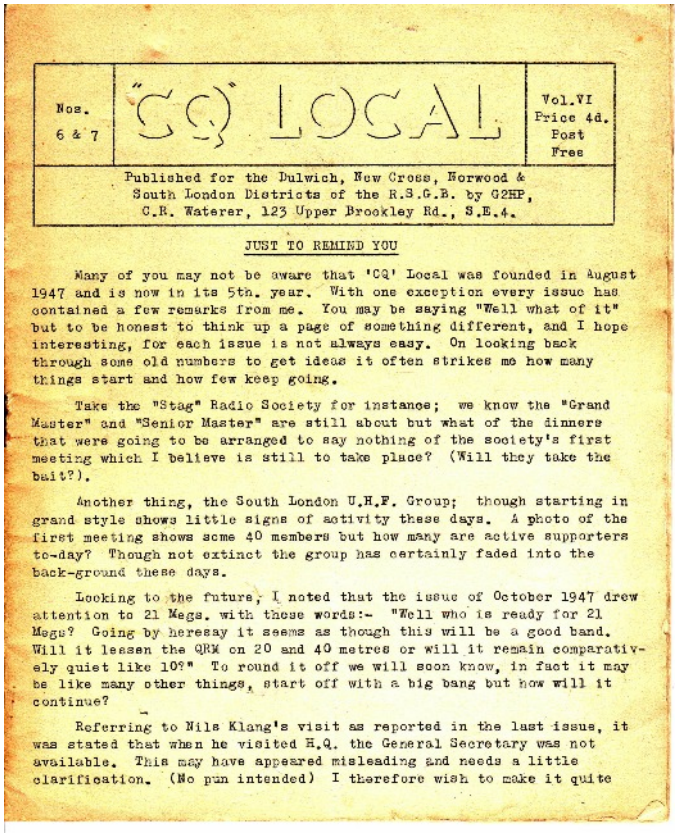
https://www.youtube.com/watch?v=S7C5sSde9e4

https://www.youtube.com/watch?v=D8EQPx-ptKk

Club Newsletter

The club newsletter fulfills a number of important functions: providing meeting information to members, technical information, advertising the club and links with adjacent clubs amongst others.

Having given two years notice, this will be my final edition as Editor. The earliest newsletter that I have in the club archives is one from 1952 which was called "CQ" Local, edited by C R Waterer G2HP and printed by A E Wybrow & Sons Ltd in the form of an A5 stapled booklet of sixteen sides - see below. This was founded in 1947 and published for the Dulwich, New Cross and Norwood & South London RSGB Groups out of which the Crystal Palace & District Radio Club was formed in 1956.



Nos. 6 & 7

"CQ" LOCAL

Vol.VI Price 4d. Post Free

Published for the Dulwich, New Cross, Norwood & South London Districts of the R.S.G.B. by G2HP, C.R. Waterer, 123 Upper Brockley Rd., S.E.4.

JUST TO REMIND YOU

Many of you may not be aware that 'CQ' Local was founded in August 1947 and is now in its 5th. year. With one exception every issue has contained a few remarks from me. You may be saying "Well what of it" but to be honest to think up a page of something different, and I hope interesting, for each issue is not always easy. On looking back through some old numbers to get ideas it often strikes me how many things start and how few keep going.

Take the "Stag" Radio Society for instance; we know the "Grand Master" and "Senior Master" are still about but what of the dinners that were going to be arranged to say nothing of the society's first meeting which I believe is still to take place? (Will they take the bait?).

Another thing, the South London U.H.F. Group; though starting in grand style shows little signs of activity these days. A photo of the first meeting shows some 40 members but how many are active supporters to-day? Though not extinct the group has certainly faded into the back-ground these days.

Looking to the future, I noted that the issue of October 1947 drew attention to 21 Megs. with these words:- "Well who is ready for 21 Megs? Going by heresay it seems as though this will be a good band. Will it lessen the QRM on 20 and 40 metres or will it remain comparatively quiet like 10?" To round it off we will soon know, in fact it may be like many other things, start off with a big bang but how will it continue?

Referring to Nils Klang's visit as reported in the last issue, it was stated that when he visited H.Q. the General Secretary was not available. This may have appeared misleading and needs a little clarification. (No pun intended) I therefore wish to make it quite

When I joined the club in 1957 the Norwood & South London RSGB Group still existed and the newsletter was a single side of A4 edited printed by our then Secretary Geoff Stone G3FZL. I took over as newsletter editor in October 1992 with edition number 443 and this edition is

number 772 so a total of 330 editions during a period of just over 27 years.

Over that time the newsletter has grown from two sides of plain text to eight sides of text, pictures, circuits, event and adjacent club meeting details and a much increased circulation. Some local clubs also circulate it to their members or make it available online.

I noticed prior to writing this piece that there were several typos in the last newsletter which was running late so not proof read - the number and date were incorrect and the front page had XXXXX for Theorist's article title - definitely time to give it up! I will however, be pleased to provide a technical article or two and information on my ongoing RF and electronic development work. Club members are always encouraged to provide contributions.

I would like to thank my XYL Cathy for many years of proof-reading & searching out snippetts of information for fillers and club member Nick Stapley for taking over the proof reading task during the last two years or so. Also my thanks go to 'Theorist' for regular and interesting articles on Physics topics, an area in which I am definitely not an expert.

The committee have been deliberating for some while on how to produce the newsletter from now on and have decided on an initial approach post AGM. The options were:

- No newsletter - this would be a disaster for the club so not a viable choice
- Continue with a monthly newsletter - so far no-one has volunteered to take over the post of editor
- Produce the newsletter every other month with a flyer of the club programme for members in the intervening months.

The latter option was chosen as the best temporary compromise. As only five club members have requested printed versions of each newsletter, the committee have decided to stop this option because of the resource required and the significant cost (a laser printer is required for efficient double sided printing). All other members and club associates receive the newsletter by email - circulation lists are available. This will be discussed at the AGM to seek members thoughts and suggestions.

Club members will be asked to take on a small part of the production process to ease the work load with one person pulling the whole thing together prior to publication. It is currently produced using a desk top publisher from Serif but a template is available for Microsoft Word / Libre Office Writer - the latter being freely available on the Internet. The plan is also to have a rolling six months of meetings arranged so that they can be published in the newsletter.

I will give very short presentation (5-10minutes at most) during the AGM on how the newsletter is currently produced.The new newsletter process will be reviewed at each committee meeting to see if it can be fine tuned.

Ongoing difficulties have been in getting articles from club members and future meeting information from local clubs in a timely manner so the new editor may decide to make changes to the overall format and content to reduce the overall effort that is required - watch this space for developments.

The Biggest Picture, by 'Theorist'

I seem to be on an 'astronomical run' of late, what with transits of Mercury and the search for ET, and this month continues with one of the most astounding recent astronomical discoveries, or indeed one of the most astounding discoveries ever made. First though I should give some relevant basic information. Galaxies contain between 10^8 and 10^{14} stars and are between 3,000 and 300,000 light years in diameter. They are separated by distances of, say, 10 million light years. The observable universe is a sphere of about 93 billion light years in diameter (nearly 10^{27} m) and contains up to two trillion (10^{12}) galaxies, a recent estimate up by a factor of ten from the old figure of 200 billion. I favour the new figure because whenever astronomers look more closely at the universe they find what was missed last time round. Now we can get to the really interesting stuff.

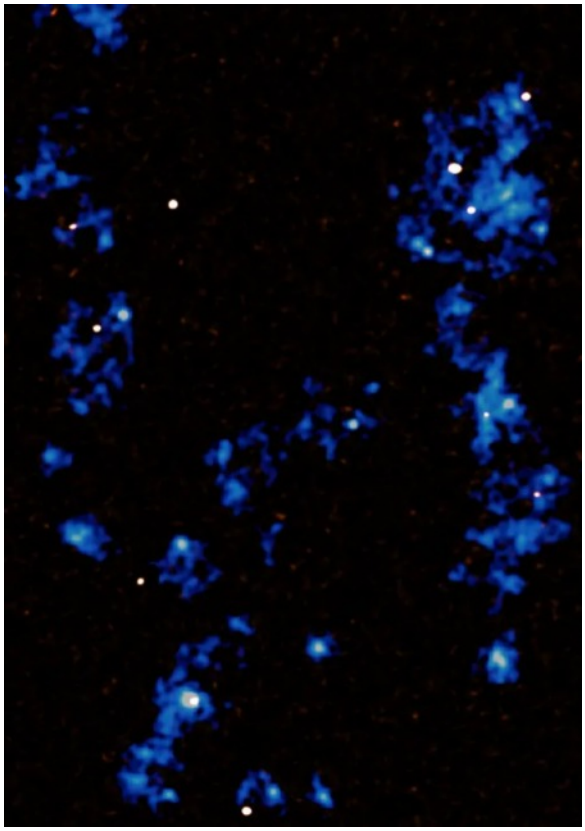
In the late 1960s evidence emerged that was pretty much accepted by all astronomers that galaxies were not randomly distributed throughout the universe but occurred in loose clusters. Our own galaxy – the milky way galaxy – was recognised as being part of the 'local group' of galaxies with Andromeda (M31) the nearest member to us of the group of 54 galaxies forming the cluster. Later, evidence began to accumulate that the clusters were themselves clustered into superclusters (SCs), with the local group part of the 'Virgo Supercluster' of some 47,000 galaxies, so called because they are broadly found in the part of the sky towards the constellation of Virgo. The SCs were thought to be randomly distributed throughout the universe. This evidence was weaker and a bit controversial, mainly because there were no optical space telescopes (the Hubble was launched in 1990) so all the data was obtained in the traditional way by taking long exposure photographic plates and pouring over them to identify the positions of the galaxies, then measuring their redshift to find out how far away they were. No automatic way existed of recording or scanning the image, or using AI to make identifications, or making a digital copy etc.

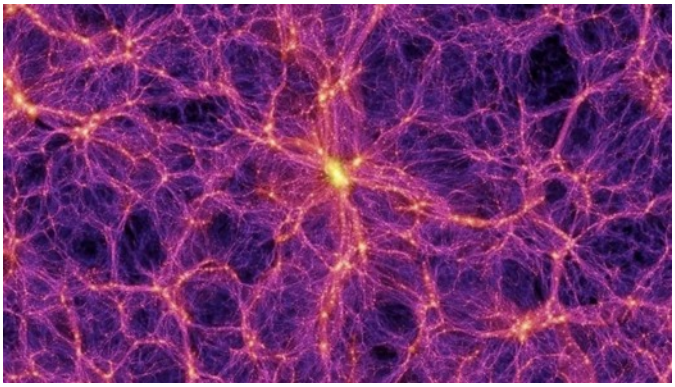
If you have ever seen a traditional astronomical plate you will know that they are about the size of an A4 sheet of paper. The first thing that will strike you is the sheer

number of things on it; they are covered with splodges and dots and specks of light and all sorts of things, thousands and thousands of them. But how can you tell a very distant galaxy from a star in our own galaxy? Maybe that thing you thought was a galaxy was a speck of dust that despite your wearing lint-free gloves, and handling everything in a dust free storage room, found its way onto the plate anyway. Maybe a scratch. And how do you prove statistically that what you think is a cluster really is a cluster and not a random alignment? How do you do the statistics anyway?

With difficulty is the answer to that last question, as you have to place a grid over the plate and count the number of galaxies in each square. Then you move the grid along a bit and do the same thing again. Then repeat. And repeat….. Then move the grid down a bit and do the same thing over and over again. Then down again etc etc. Then you can do some fancy stats and get an answer. You have to keep moving the grid because you might have cut a cluster in half, or accidentally created an imaginary cluster by chance when placing the grid first time round.

Enter the Hubble and similar instruments, and add modern technology and the picture clarifies but also changes. Now we know that galaxies do indeed form SCs, and that the Virgo SC is part of an even bigger supercluster called the Laniakea SC of 100,000 galaxies, and incredibly that *the SCs form huge filaments of galaxies* of about 150 -270 million light years long which form the boundaries of voids where few(er) galaxies exist. This filament structure is the largest structure ever found, and perhaps likely ever to be found. Think of the inside of an Aero chocolate bar and you get some idea of what our universe looks like on the largest scale, with the strands of chocolate replaced by knotted, twisted strings of superclusters, with almost unbelievably colossal groupings of galaxies where the strands join up with one another. This filament structure is generally known as the 'cosmic web'.





The photo above obtained from the Very Large Telescope in Chile shows an area of sky 12 billion light years away and is therefore an image of the universe when it was 'just' 2 billion years old. You can clearly see two filaments running vertically. The very white objects are new galaxies full of new stars, and light from them is illuminating the gas that will eventually form the filaments. The second image (above) is derived from a simulation model of the evolving universe but matches closely what astronomers can see piecemeal on a smaller scale.

Sometimes in an Aero bar you find a very large hole. I have made it sound (and the images suggest) that the voids are like the Aero holes and contain no galaxies at all. In fact they are really regions of underpopulation of galaxies. Indeed the local group of galaxies is on the edge of one such void which stretches some 200 million light years where the galaxy density is perhaps only 15% of expected. However the current record for the largest void is a region of space some 1.8 billion light years across about 3 billion light years away, which appears to be missing 10,000 galaxies compared to a normal density. It is known as the Eridanus Supervoid and was picked up by NASA's WISE telescope. It was found by looking at a cold spot in the cosmic microwave background. I can't wait for the next generation of space telescopes and the fantastic discoveries that they will find.

I cannot finish without thanking Bob for his sterling efforts over several decades as newsletter editor. He has often produced an 8 page newsletter with little or no contribution from others month after month. I am personally grateful that he has published my efforts even though they largely have nothing to do with radio or electronics. I also know that Nick, who occasionally fills in for me, also wishes to thank Bob for his efforts. Thanks indeed Bob, you will be hard to replace.

Member News

a) Member subscriptions for 2020 became due on 1st January 2020 and the treasurer will be pleased to receive your payment of £12.00 as soon as possible. If you would like to pay by bank transfer please contact our Treasurer. As specified in the club constitution, members who have not paid by the end of March will be deemed to have resigned.

Club News

We have received an invitation from Sutton & Cheam Radio Society to an inter-club quiz on 15 October 2020 at their regular meeting room at Sutton Football Club close to Sutton Railway Station. If you would like to join the team to represent the club then please contact a committee member.

Technical Snippetts

a) There's Life in the Old Router Yet by Gareth Evans G4XAT

One of the fastest moving areas of Amateur Radio is Digital Amateur TV. The advent of affordable Software Defined Radios (SDRs) that can support TRANSMIT as well as receive have really opened up some possibilities. Some very clever people are writing the software on an almost daily basis and the possibility of having an ALL-BANDS ALL-MODES transceiver from 50kHz up to 6GHz is now a possibility for under £200, assuming you already have a PC or laptop.

So what's an old router got to do with all this? Well, one of these affordable SDRs is the ADALM Pluto https://uk.farnell.com/analog-devices/adalm-pluto/eval-board-rf-agile-transceiver/dp/2725085?st=pluto but available from several other suppliers such as Digikey UK.

It's pretty versatile 'out of the box' but a 10 minute hack turns it into a magic box with transmit and receive capability from 70MHz all the way up to 6 GHz. If you just want to receive what's around then the SDR Console software (which supports TX in 'traditional modes) is a good start and for DATV SDR Angel (a bit obscure but with YouTube tutorials it works well). There is also some AMSAT software that recently added receive support for the Pluto, for ALL DATV modes (of which there are several). It's even got a dual-core Linux capable CPU packed away inside!

To move on you first need to read this article: https://wiki.batc.org.uk/Custom_DATV_Firmware_for_the_Pluto which explains in detail what to actually do to get the software into the Pluto. And (at last) this is what I needed an old router for!

By using some free software on a mobile phone (Larix) you can stream live video (from either of the phones cameras, if so equipped) via Wi-Fi to a Pluto on the same network. The Pluto then obligingly transmits the digital stream on the chosen frequency in the chosen format and bit rate. Pretty amazing, and it worked fine on my home network. But I want to use this set-up when out portable in my camper/radio truck. So I reached into the 'junk box' and retrieved an old ADDNW 4 port router and Wi-Fi access point. This was soon up and running, but there was a problem: if a 'real' internet connection was lost, the Wi-Fi dropped out. Not a lot of use in the middle of a field. So when Bob offered his old router for sale, I expressed some interest. Bob kindly passed it to me by hand of Andrew and on returning home I once again went through the hook-up procedure. As a router it has ADSL input and two RJ45 ports (Pluto on one, laptop on the other) plus the Wi-Fi. Once the chain was configured (Pluto, Phone and laptop) I was very pleasantly surprised to see that Wi-Fi worked in the absence of any internet.

So I can now control my Pluto wirelessly from my phone, actually my previous Android phone - a old Nexus5 - as my current phone will be providing the data hotspot for internet access on the laptop etc. No, you can't use it as a hotspot and as a roving camera, at least not at the same time – I somewhat hopefully tried that!

There is no soldering involved or tricky leads to make or buy. All the software is free (but I'd encourage you to contribute a little coffee/beer money) and once you've read the instructions a few times it all makes sense. Yes it's sort of 'black box operating' but there remains plenty of scope for suitable amplifiers, beams and doing a nice job of boxing it all up.

So the old adage 'I'll keep that, it might come in useful one day' does actually ring very true – thanks for the old router, Bob!

[This is the router that I advertised in a previous Palace Pulse and then donated to a 'good cause' - Ed]

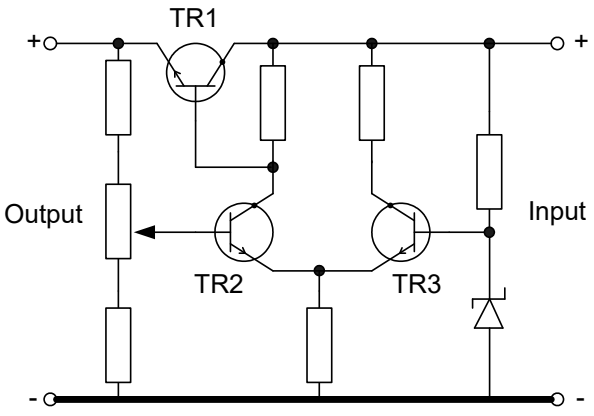
b) Low Drop Out (LDO) Regulators:

Conventional power supply regulators use one or more cascaded emitter/source followers or Darlingtons as current amplifiers in the output stage. These are fine but can result in a relatively high voltage drop (headroom) across the current amplifiers from input to output. Each bipolar emitter follower causes a voltage drop consisting of the 700mV across the emitter base junction and up to two volts from the collector to emitter depending on the device saturation specification. Power (enhancement) FETs may require a higher voltage drop as the gate to source voltage for drain conduction can be as high as four volts. The voltage drop across the device(s) results in higher power dissipation and more heat to remove.

When the input to output voltage difference drops below the headroom threshold then the regulation will fail. One way to reduce this voltage drop is to use the opposite polarity device as a common emitter amplifier i.e. instead of an NPN emitter follower a PNP common emitter amplifier or the FET equivalent is used with a low saturation voltage specification. This technique can reduce the headroom voltage to a few hundred millivolts.

Shown below are two simple example circuits showing the difference between a conventional regulator and an LDO version. They deliberately exclude decoupling, frequency compensation etc to keep things simple.

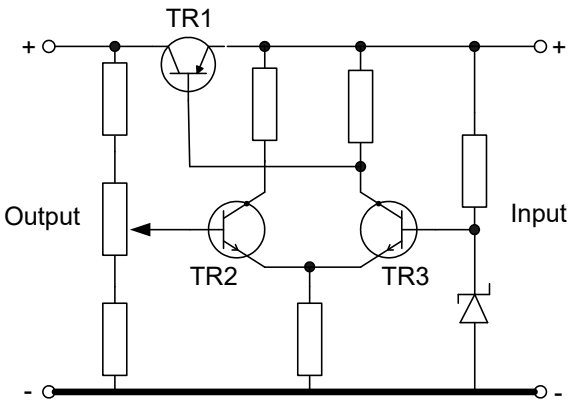
In the first circuit TR1 is an NPN device so the headroom voltage will be at least 3v and possibly more depending on its specification. The potentiometer adjusts the output



voltage and the zener diode determines the minimum output voltage.

In the second circuit on page 6, TR1 is a PNP device so the headroom voltage will be much lower as it is primarily determined by the saturation specification of the device. Note that in this circuit the drive to the output device is taken from the other side of the long tail pair because of the inversion in TR1.

There are many commercial LDO regulators available with maximum output currents from 100mA to several amps. For example, the LP2951 has an output voltage range of 1.24 - 29v at a maximum output current of 100mA and a drop out voltage of 380mV.



c) Technical Web Sites: The following web sites have a large collection of articles linked to each opening page:

https://www.qsl.net/va3iul/

http://www.reeve.com/RadioScience/Radio%20Astronomy%20Publications/Articles_Papers.htm

https://martein.home.xs4all.nl/pa3ake/hmode/links.html

https://www.qsl.net/yu1aw/Misc/engl.htm

The last site has a recently completed design for a 144MHz 20KW input linear amplifier using a single GU-36B-1 on a 7KV supply. This valve requires a heater supply of 8V at 110-130A and 800W of drive power. A three phase mains supply had to be provided. Other topics include aerials and receiver preamplifiers.

Miscellaneous

a) Kirkaldy Testing Museum: I revisited this establishment which is fairly close to London Bridge rail station. This museum celebrates the work of David Kirkaldy and his family at his Testing and Experimenting Works (99 Southwark Street, London SE1 0JF) which set international standards in testing materials and from which everyone's everyday life benefits today. The general testing machine on the ground floor is shown below.

This machine was designed by David Kirkaldy, built by Greenwood & Batley of Leeds, has a length of 47 feet 6 inches and can generate a total force of 300 tons. It was used to test metal items in tension, bending, compression and shear. It is powered up occasionally for demonstrations and the next run is expected to be on 08 February 2020 for which you need to book your place.

There are a number of other testing machine available to view including a Vickers Hardness Tesing Machine. In the basement you can watch a video on the museum and listen to presentations on the operation of the chain tester and concrete tester. There are a small number of items of electrical test gear present.

I spoke to Tim, one of the volunteers, who explained that their test equipment was used to test parts for the Comet aircraft and he has provided some documented results.

The entrace fee is £8 (£6 for concessions) which has had to be levied because their new lease is a lot more expensive and no formal funding is provided. Guided tours are available. This museum is well worth a visit and is a good facility to support.

See http://www.testingmuseum.org.uk/ for more information.

b) Benjamin Franklin House: Cathy and I visited this property at 36 Craven Street, London WC2N 5NF over the Christmas period where Benjamin Franklin, scientist, diplomat, philosopher, inventor and US Founding Father lived from 1757 to 1775. The house, which first opened to the public on Franklin's 300th birthday in 2006, has been been restored to its 18th century lustre and functions as a museum and educational facility. The house was once an anatomy school.

In 1761 Benjamin Franklin designed and made a musical instrument called an Armonium consisting of a series of smooth circular glass structures mounted on cork on a metal centre rod. When the rod is slowly rotated and a

damp cloth covered finger touches the rim of each glass item it oscillates, producing a melodic sound in a similar manner to a wine glass. Beethoven and Mozart both composed music for this instrument.

See www.benjaminfranklinhouse.org for more information.

c) Science Museum: The 'Top Secret' exhibition is showing in the Basement Gallery level -1 until 23 February 2020. Entry is free but you are asked to book a

time slot as it has been very busy. To quote from the website:

'*From the trenches of the First World War to the latest in cyber security, Top Secret explores over a century's worth of communications intelligence through hand-written documents, declassified files and previously unseen artefacts from the Science Museum Group's and GCHQ's historic collections.*'

Items on display included a Fullerphone, National HRO receiver, an Enigma machine, a Russian short wave transmitter/receiver from 1961, a Commodore PET 32K computer based ocean modelling setup, a very large aerial matching coil from the Rugby LF transmitter, a number of early valve broadcast receivers (a homebrew one is shown below - a work of art!), a 10W telegraph and telephony transmitter and the power section of a 1.5KW BBC short wave transmitter. The latter item is shown on page 9 and could now be provided in a single desktop unit using modern technology.

Notice Board – Wanted and For Sale

The Notice Board is for all club members to use so if you have one or more items that you wish to buy or sell then please send in the details. Some of the current list of items may be viewed at:
http://cprec.btck.co.uk/SaleofClubEquipment
All prices exclude P&P.

For Sale

a) CPREC has a large bank of fundamental and overtone quartz crystals, from 1.0 – 99.91MHz and the list is on the club website as a downloadable PDF file. Prices are £1 each to club members and £2 each to non members, excluding P&P. Contact Bob on 01737 552170 or G3OOU(at)aol.com.

All items are offered on a first come first served basis.

73

G3OOU

Diary of External Events

02 Feb 2020 - South Essex ARS 36th Canvey Radio & Electronics Rally

Cornelius Vermuyden School, Dinant Avenue, Canvey Island, Essex SS8 9QS. Talk in 145.550MHz. Free car parking, two large halls. Opens 10am, disabled visitors 9.45am. Entry £3, children under 10 free. Tea, coffee, soft drinks and bacon butties will be available. Radio, computing and electronics traders. Details from Tony, G0JYI via tony@tonystreet.net.

09 Feb 2020 - Harwell Radio and Electronics Rally

Didcot Leisure Centre, Mereland Road, Didcot, Oxon, OX11 8AY (3 miles from A34 Milton Interchange). Open 10am to 3pm, entry £3 (under 12s free). Free car parking, disabled parking and facilities. Talk in 145.550MHz (G3PIA). Traders, SIGs and RSGB Bookstand. Home-made refreshments. Details from rally@g3pia.net or 01235 816379 [www.g3pia.net].

23 Feb 2020 - Rainham Radio Rally

The Victory Academy, Magpie Hall Road, Chatham, Kent, ME4 5JB. Open 10am to 3pm, local and national traders, BRATS Kitchen, Interactive Zone for Kids and Junk, Talk in on 145.550MHz using GB4RRR. Contact 07825 838 877 or rally-coordinator@brats-qth.org

29 Mar 2020 - Hamzilla Radio Fest 2020

Discovery Science Park, Gateway House, Ramsgate Road, Sandwich, Kent CT13 9FF. Open 9.30am for early bird admission £5, 10am for general and disabled access £3, under 16 and disabled carer free. There will be trade stands, exams available on the day and hot and cold refreshments. www.hamzilla.uk

14 April 2020 - West London Radio & Electronics Show (Kempton Rally)

Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ. Talk-in station, free car parking, opens at 10am with disabled visitors gaining access 10 minutes earlier. Trade stands, Bring & Buy, special interest groups and lectures. Catering is available on site. More details from Paul, M0CJX on 08451 650 351, info@radiofairs.co.uk or www.radiofairs.co.uk.

14 June - East Suffolk Wireless Revival (Ipswich Radio Rally)

Kirton Recreation Ground, Back Road, Kirton IP10 0PW (just off the A14). Opens at 9.30am, entry £2, free car parking, trade tables from £10. Trade stands, car boot sale, Bring & Buy, special interest groups, GB4SWR HF station and RSGB bookstall. Catering on site. Contact Kevin G8MXV, 07710 046 846 or www.eswr.org.uk

25-26 Sep - National Hamfest

Newark & Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark, Nottinghamshire NG24 2NY.

9-11 Oct - RSGB Convention

Kent's Hill Park Training and Conference Centre, Swallow House, Timbold Drive, Kent's Hill Park, Milton Keynes, Buckinghamshire MK7 6BZ.

News from Other Clubs

Club Secretaries – please ensure that your future meeting details are present in your newsletters, on your websites or sent to our newsletter editor Bob G3OOU. Palace Pulse is published about ten days before our club meeting which is on the first Friday of each month and closes for editorial contributions a few days before

publication. Due to differing publication dates and short lead times it is getting increasingly difficult to include other clubs' events although we will endeavor to do so if advised in time. **If we are regularly unable to obtain the information then that club entry will be removed from this newsletter.**

Readers - If you plan to visit one of these club meetings please check with the club concerned in case of any last minute changes.

Bredhurst Receiving and Transmitting Society
Meet on Thursday night from 8:30pm at the Parkwood Community Centre, Long Catlis Road, Rainham, Kent, ME8 9PN. Contact secretary@brats-qth.org or http://www.brats-qth.org/brats/
06 Feb RTTY Interface Building
05 Mar RTTY Interface Building

Bromley & District Amateur Radio Society
Meets at 19:30 on the third Tuesday of each month at the Victory Social Club, Kechill Gardens, Hayes, Bromley, BR2 7NH. Contact Andy G4WGZ on 01689 878089 or enquiries(at)bdars.co.uk. Web: www.bdars.co.uk
18 Feb Introduction to FT8 by Alan G0TLK
19 May Getting on the Air with Digital TV by G8YTZ
16 Jun Direction Finding

Chelmsford Amateur Radio Society (CARS)
Meets at 19:30 on the first Tuesday of each month at Oaklands Museum, Moulsham Street, Chelmsford, Essex, CM2 9AQ. Contact: secretary(at)g0mwt.org.uk Web: www.g0mwt.org.uk
04 Feb Portable Operation and OAS

Coulsdon Amateur Transmitting Society (CATS)
8:15pm on 2nd Monday each month. Contact: Andy Briers G0KZT on 07729 866600 or secretary(at)catsradio.org. Web site: http://www.catsradio.org/
10 Feb Practical Evening, Fix-its, Electronics Play, Social
09 Mar Surplus Sale/Auction

Crawley Amateur Radio Club (CARC)
Every Wednesday 20:00 – 22:00, every Sunday 11:00 – 13:00. Formal events are on the fourth Wednesday of the month, 7-30pm for 8pm. Phil M0TZZ on 07557 735265 or secretary(at)carc.org.uk or Web: http://www.carc.org.uk/
18 Feb SCARF Meeting

Cray Valley Radio Society (CVRS)
Meets at 8pm on the 1st and 3rd Thursday of each month at 1st Royal Eltham Scouts HQ, Rear of 61 - 71 Southend Crescent, Eltham, London, SE9 2SD. Contact: Richard on secretary[at]cvrs.org .Web www.cvrs.org
20 Feb Urban QRM - What Can We do - Tony G2NF
19 Mar CVRS Annual Construction Contest

Dorking & District Radio Society
Meetings at 7.45pm. Contact: David Browning (M6DJB) at djb.abraxas(at)btinternet.com. Web site: http://www.ddrs.org.uk
28 Jan Practical Fault Finding by Martin Butler M1MRB
25 Feb Visit to Vintage Radio Museum, East Dulwich
24 Mar Count Basie And His Discovery Via Ionospheric Propagation by Colin Richards G3YCR
28 Apr Propagation Prediction Using the Chilbolton Ionosonde by Philip Miller Tate M1GWZ
26 May 6m Operation by Chris Deacon G4IFX
23 Jun Direction Finding by Denis Noe M0NDJ

Echelford Amateur Radio Society
Meetings on 2nd and 4th Wednesdays of each month at new venue: St. Hilda's Church Hall, Stanwell Road, Ashford, TW15 3QL. Enquiries to Phil at M1GWZ(at)icloud(dot)com. Web site: http://www.qsl.net/g3ues/index.htm
12 Feb 20 Loop Antennas - Colin Berry, M0GXV
26 Feb 20 Annual Construction Contest - what have you been making recently? Bring it along!

Hastings Electronics & Radio Club
Meetings held at the Taplin Centre, Upper Maze Hill, St Leonards on sea, TN38 0LQ, 7pm for 7:30 on the fourth Wednesday of each month. Information from Gordon Sweet M3YXH on 01424 431909, email: sionet3344(at)hotmail.co.uk
Web: http://herc-hastings.org.uk/

Horsham Amateur Radio Club
meets on the first Thursday of each month at the Guide Hall, 20 Denne Road, Horsham, West Sussex, RH12 1JF. NRQ TQ172304 at 20.00hrs local time. Contact Alister Watt G3ZBU at g3zbu(at)hotmail.com or http://www.harc.org.uk/
06 Feb HARC - CARC Challenge

Mid-Sussex Amateur Radio Society (MSARS)
Meet most Fridays in the Millfield Suite, Cyprus Hall, Burgess Hill, RH15 8DX from 7.30pm till 10.00. Contact Stella on 01273 844511, M6ZRJ(at)msars.org.uk or www.msars.org.uk
31 Jan G5RV on the Air
07 Feb Radio Discussion Night
14 Feb Film Night

North Kent Radio Society
Meets at the Hurst Community Centre, Room 15, Hurst Place, Bexley, Kent, DA5 3LH. Doors open at 8PM. More information from Stephen G8JZT on secretary@nkrs.info or 07985 753370 evenings or weekends.
Web: http://www.nkrs.org.uk/
18 Feb Bring a Thing Night
17 Mar Icom R8600 by Robin M0RJT
21 Apr Andy from SDRPLAY - more information to follow
19 May Flying by John Knight
16 Jun East Anglia Military Airfields by Ian G7PHD

South East Essex Amateur Radio Society (SEARS)
Contact Mark Callow 2E0RMT on 07842 336444 or secretary(at)southessex-ars.co.uk or http://www.southessex-ars.co.uk/
Meetings: 7pm 2nd Tuesday each month at The White House, Kiln Road, Benfleet, Essex, SS7 1BU.
11 Feb Rally summary and recap
10 Mar A talk about his time in the Royal Signals by Nigel Newman M0ICH

Surrey Radio Contact Club (SRCC)
7.30 for 7.45pm on 1st. and 3rd. Mondays every Month. Contact John Kennedy G3MCX on 020 8688 3322 or secretary(at)g3src.org.uk. Web: http://g3src.org.uk/
03 Feb Digital Voice Communications by G6PTY

17 Feb Skills and Fixit
02 Mar Spring Surplus Equipment Sale
06 Apr AGM

Sutton & Cheam Radio Society
8pm on 3rd Thursday every month. Contact Chris Howard at info(at)scrs.org.uk Web: http://scrs.org.uk/. SCRS run a practical group most Monday evenings at the Bandstead Scout Hut.

20 Feb Sutton and Cheam, the early years. Neil Horton, M0ZEY
19 Mar Building the QRP labs QCX kit, Matthew Nassau, M0NJX
16 Apr From Top Band to 198 Long Wave by Jim Lee, G4AEH
21 May AGM and Construction competition
18 Jun HF Transceiver Performance - Rob Sherwood KC0B
16 Jul Dr Elizabeth Bruton, Curator of Technology and Engineering, Science Museum London

Please replace the (at) with @ when using any email addresses shown in this newsletter.

Local Training Courses - Please note that the new syllabus is now in operation.

Crystal Palace Radio & Electronics Club is a member of the South East Tutors training group.

Licence Level	Dates	Location	Club Provider	Format	Further details
Foundation	1 & 8 Feb 2020	Eltham, SE9 2SD	Cray Valley	Two Saturdays	www.cvrs.org
Intermediate	05 Apr - 07 May 2020	Bromley BR2 7NH	Bromley & District ARS	Three Sundays	www.bdars.co.uk
Foundation	04 Oct - 18 Oct 2020	Bromley BR2 7NH	Bromley & District ARS	Two Sundays	www.bdars.co.uk
Intermediate	14, 21, 28 November 2020	Eltham, SE9 2SD	Cray Valley	Three Saturdays	www.cvrs.org
	= course commenced				

Palace Pulse is published ten days before each meeting and closes for contributions five days before the publication date. Please send contributions to the newsletter editor shown below.

CPREC Committee Information

Officers:		
Chairman:	**Secretary:**	**Treasurer:**
Damien Nolan 2E0EUI	Alan O'Donovan G8NKM	Ian Skeggs M6FZC
E: cprec.g2lw(at)gmail.com	E: cprec.g2lw(at)gmail.com	E: cprec.g2lw(at)gmail.com
Committee Members:		
Bob Burns G3OOU	Newsletter Editor (until end of January 2020)	T: 01737 552170 E: g3oou(at)aol.com
Nick Stapley	Web Manager	