

HARCNEWS

The Journal of

Horsham Amateur Radio Club

Est. 1938



G4HRS

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Notes From The Editor

Those taking part in the Club Championship contests have found it hard going with long skip conditions. As the days move on pass the equinox and with the lighter evenings things should improve. Perhaps some of the earlier contests should take place on 160m as opposed to 80m, what do you think? Since my amateur radio licence was due for renewal in February a pack arrived with instructions from Ofcom.

I duly went to the web address and registered and within a short space of time confirmation arrived in the post that my username was activated. I was then able to validate my details for the 5-year period. I did find the web site registering rather confusing but there is a file that can be downloaded which explains how to do it. One thing that is not provided is provision via the web site to get a new password or change the challenge question that one would expect.

In the event of needing either it is necessary to telephone Ofcom during office hours but is probably done for security purposes. A warm welcome to the club goes to two new members. They are Bernasinski Wojtek who holds the callsigns G0IDA/SP5GU and Ovidiu Popa M/YO4GMS. Those interested in stargazing will be interested to know that a collection of stamps have just been issued celebrating the 50th Anniversary of The Sky at Night TV programme.

In February I went to 'An Audience with Paul Daniels' at the Capitol Theatre in Horsham. The first part of the show was mostly about the audience asking questions along with the occasional magic trick. I asked where his catchphrase originated. Paul said a heckler in an audience shouted out 'I don't like your suit' and I bounced back with 'That's a shame, 'cos I like yours, not a lot, but I like it' and the catchphrase was born.

The second half of the show was where all the magic was performed, very entertaining indeed. I did notice that the trick with three pieces of rope that was performed once at a HARC club night by Mick G4EFO also appeared and I still don't know how it's done! In 1992 I attended the 'It's Magic Tour' in Worthing and this included Paul's wife Debbie, son Martin who now works on BBC Radio Lincoln and a miscellany of guests.

I shall now disappear until next month!

David G4JHI

February Meeting Review:

Radio and Telecommunications, by David Sumner G3PVH

In this lecture David treated us to a wide ranging feast of anecdotes and pictures that told the story of the place radio has had in telecommunications, from the days of Faraday and Maxwell through to the present day world of fibre optics, satellites, and digits and chips with everything. The first transatlantic telegraph cable was laid in 1858 but its high capacitance prevented useful transmission speeds. Better results, but still only a few words per minute, were obtained from cables laid in 1865/6.

However progress continued so that by 1906 there was a submarine telegraph cable network that included most of the British Empire countries. The first successful transatlantic telephone cable (TAT1) did not appear until 50 years later, 1956. While waiting for that, telephone traffic across oceans depended on radio.

In the early days long wave radio on 60kHz. Very long wave (Rugby transmitter GBR on 16kHz) was also used for the Empire telegraphy network and in 1926 for a radio facsimile demonstration using the dot modulator system. The engineering of the long wave stations was on a heroic scale, with power outputs of 500kW or more from 54 paralleled valves (10kV on the anodes and 10kW output each), 800 ft antenna masts mounted on blocks of insulating Swedish granite to kill mast currents, unbelievable ground plane arrays, and so on.

We also saw a picture of a later demountable valve capable singly of 500kW output. True then as it always is, aerials are the key to a successful radio circuit so MUSAR (multiple steerable array of rhombics) was used to investigate the angle of arrival of transatlantic signals and so to improve receiving aerial design. When the time came to sweep away these old time marvels David was active in preservation efforts but regrettably little remains to see of the engineering. More priority was given to the architecture.

The submarine cables were amazing in a different way. Attenuation was 55dB per 37 miles, these figures being the gain feasible from the repeater amplifiers and the consequent repeater spacing. TAT1, (originally carrying 36 off 4kHz ssb speech channels, later 47 off 3kHz) had 51 repeaters and ran from Oban, Scotland to Clarenceville, Newfoundland. (Consider this in comparison with the 100dB attenuation of a transatlantic hf radio path.)

The Commonwealth-Pacific Cable (COMPAC, 1961/3) which carried 80 off 3kHz ssb speech channels, was 8150 miles long and had 322 repeaters. Repeaters comprised a working and a standby amplifier, each having 3 valves type 6AM6 – special 20yr life ones! The heaters of all the valves in the cable were connected in series so a device was included to bypass a heater if it failed open circuit. From 1932 onwards shortwave (vhf) radio circuits were

introduced for such as a telephone link across the Bristol Channel.

Super-regeneration receivers with a push-pull r.f. oscillator and a separate 60kHz quench oscillator was the technology, which had enough sensitivity/gain to require no further amplification. High gain antennas were feasible such as three stacked full wave horizontal dipoles, rhombics (terminated with 600ohm), and inverted vee long wires (terminated with 400ohm).

With a nostalgic moment for what looked like amateur radio, David had to move us on to more modern times and technologies used in his own career with the industry. He demonstrated his homemade model of a 4-bit pulse code modulation system that converted audio to digits and back again. The commercial digital telephone system uses 8kHz sampling and 8 bits encoding resulting in 64kBps on the 'phone line. Digital audio is not feasible for hf amateur radio since it would take too much bandwidth.

A circular pipe, circular polarization radio wave-guide system had been considered for trunk circuits but was not practical. But optical wave guides i.e. optical fibre cables are the bee's knees. 10GBps is standard, 100GBps is easy, and repeater spacing can be 50km. Implementation is absolutely simple. David had worked in Fujitsu on a scheme to use optical fibre all the way to the subscriber but that is not now happening; the 'final mile' will remain copper.

David had been involved with microwave links from the early days of transatlantic television in the 1960's via Telstar 1, the Goonhilly satellite dishes station in Cornwall and the Post Office Tower in London with its awkward-to-mount horn antennas. Red faces on first use when they found the sense of the system's circular polarization was of opposite hands on the two sides of the Atlantic giving a 30dB path loss penalty!

G4FQR

ALMA

Atacama Large Millimetric Array

by Ron Polley G3PYC

This will comprise sixty four 12-meter diameter dish Aerials in an interferometer network. There will be 150 positions for the dishes to work from. This will give variable apertures from 50 meters out to 15 km. The dishes are to work in the sub millimetre wavelengths from 0.75 to 1.5 mm. (app 300 Ghz). The dish surfaces have to be true to 0.1 mm all over. In order to see if this tight tolerance of the surface was possible orders for a dish were placed with manufacturers in Japan, USA and Europe.

All 3 produced acceptable prototypes. The 3 were then given basic details of the complete supporting structure and the movement and controls required to operate them. All came up with suitable structures and the full 64 orders spread amongst them. Operating at these frequencies requires the air to be very dry as water vapour attenuates these signals. A place in Chile was chosen adjacent to the Atacama Desert almost astride the tropic of Capricorn.

A plateau was chosen at 17,000 ft asl. To build railway tracks for the dish structures to move on was deemed to be almost impossible, due to the terrain and the cost prohibitive. These structures weigh around 110 tonne, so a 36 wheeled fork lift tractor was designed that would pick up these dishes and move them along dirt tracks to the pad that they were required to stand on.

At 17,000ft people, unless acclimatised, can only spend an hour or two before they become disorientated. All the

dishes will be controlled from a control room at an altitude of 10,000ft. Also at this site is the maintenance shed for the dishes and alongside is a visitor centre with several video screens. There is a dirt track 20km long that connects the 2 sites and the tractor carries dishes along it when required.

Each of the 150 pads has precise positioning devices and all the pads are at the same elevation. Visiting the dish site you are allowed only one hour at the site and must have water and oxygen and be accompanied by a special ambulance and staff. The instructions on arrival are to exit the vehicle slowly, take three large breaths from your oxygen bottle and walk around at a leisurely pace. Most people at the end of an hour react as though they have had a little too much to drink.

The reason for this special array is to look at the dark parts of our galaxy and universe. There are a lot of stars that are not bright and surrounded by gas and dust that stops conventional telescopes from locating their precise position in space. Sub millimetre radio waves can pass through this haze. A single sub millimetre dish located in Hawaii had discovered some 20 red dwarf stars within 30 light years of the Sun.

Astronomers have for some time been certain that the Sun has a partner and one of the first jobs for ALMA with just a few dishes is to verify precise distances of these and any other stars that may appear. The remaining bit of atmosphere will cause a bit of twinkle to these sub millimetre radio waves so a device will measure the rate of twinkle from a suitable quasar and correct for it.

Quasars generate a fair amount of radio at the right frequency. The site is run by the European Space Organisation. The plateau is called Chajnantor and is close to the three borders of Chile, Argentina and Bolivia. The moving of a dish to a new pad will take 2 to 5 hours and

taking a dish to and from the maintenance shed some 10 to 12 hours. The first science to be obtained from the site is scheduled for 2008.

The tractor weighs 130 tonne and the cab is pressurised. It was not explained how they power these dishes and what happens if the tractor crew have to get out and do something. Also how do they keep the polished dish faces free of dust after a 20km drive over dirt roads.

TV Addict

Multi Coloured Swap Shop was first seen on our Saturday morning screens back in October 1976 and a special edition celebrating the 30th Anniversary was broadcast over the Christmas period of 2006. The original presenters were Noel Edmonds, Keith Chegwin, John Craven and Maggie Philbin whom all appeared once again. The main difference was that a studio audience was in attendance some who had telephoned SwapShop during the original series.

One week Prime Minister, Margaret Thatcher appeared and spoke with viewers that had never been done before on a TV programme. Live swaps happened with the studio audience who had brought along all sorts of unusual items. The end of the show looked at the programmes that have been running since Swap Shop came to an end in March 1982.

Please send contributions for the April edition of HARCNEWS to the editor by 21st March. Items received after the deadline will be held over until a later edition.

All input is subject to suitability and available space.

For items sent by email please send to this address:

harc.news@g4jhi.co.uk

Radio Diary

Mar 1st, Club Night: Junk Sale

Mar 3rd-4th, M0VOG Radio Rally - Woolwich

Mar 5th, 80m Data Club Championship 20:00 - 21:30

Mar 14th, 80m CW Club Championship 20:00 - 21:30

Mar 15th, Social Evening - The Queens Head - West Chiltington

Mar 17th, Crystal Palace Radio & Electronics Club Radio & Electronics Sale 10:00

Mar 22nd, 80m SSB Club Championship 20:00 - 21:30

All above times are UTC

Committee/Club Meetings and Socials start at 8pm

HARC Subscriptions

A reminder that subscriptions are now due. If you have not paid as yet then please forward your £15 to the Treasurer. Cheques should be made payable to H.A.R.C. If you wish to send your payment in the post the address is Paul Barnett, 8 Parsonage Road, Horsham, RH12 4AR.