

HORSHAM AMATEUR RADIO CLUB

# *HARCNEWS*

## *Coming Shortly*

Jan 15th Club Evening Inimitable Codes and Cyphers  
by Alister Watt G3ZBU

Jan 11th Club Event 80m AFS CW

Jan 18th Club Event 80m AFS SSB

Feb 1st Club Event Fox Hunt

## *January 2004*

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# *Foundation Course Update...*

There were 8 people on the course this year of which only one just took the Morse Assessment. Of course the Morse requirement for hf operation has finally been abandoned so there will not be any Class B licensees upgrading to an M3 callsign via this route.

Last year we had 28 in total. About half of those upgraded from Class B.

Next year we hope to hold both Foundation and Intermediate

courses. There is considerable interest from ex-CB radio operators in these courses. After December, all new entrants to the hobby will have to take the Foundation course. Optionally they may upgrade to a full licence via the Intermediate course.

These two courses are likely to be held at the Scout Hut at Christ's Hospital School, as the venue has to be certified (as do the Instructors!).

## *January Meeting*

Please note that the January meeting will be on 15th Jan 2004 due to Guide Hall being used on 8th.

*A Brief History of Codes and  
Ciphers, a preview of the 15th  
January talk  
by Alister Watt G3ZBU.*

Secret messages have been around for thousands of years. A code is very much like a virus. It is first of all generated by someone and continues in use until the means to crack it is finally discovered.

The code method then changes until that one is also cracked and this process goes on ad infinitum, just like viruses become immune to a particular antibiotic and evolve by learning resistance.

There are exceptions to every rule, and in this case it is not unknown for messages to be deliberately sent in the knowledge that they will be intercepted and decoded giving duff information to an enemy.

Some amusing techniques were used to hide messages in the past. A messenger would have his head shaved, the message

written on his scalp, and when his hair had grown, the messenger could deliver the message. This is not a lot of use if you want to pass the message “See you in the pub tomorrow!”, for obvious reasons.

A code is a symbol that represents a word. Normally a code book would be handed out and entries could be

- 1: attack
- 2: retreat.

A cipher exchanges a letter with another letter or a symbol, e.g. A = .\_, B = \_... (Morse code).

The Caesar cipher was used for a phenomenal 1500 years before being cracked. It uses two discs of different diameters, which can be rotated about each other.

The alphabet is written on both discs. To use it, offset one disc

so A is above Z, for example. Then IBM is coded as HAL. To crack the code without knowing the offset, simply walk through the alphabet adding one character at a time until a sensible message appears.

As an aside, Morse code is very efficient (for some people!) In sending English messages, But when E could be coded as Z, things will slow down and efficiency drops.

About 500 years ago this cipher was modified to use a random shift for each character. To crack this we need to count the occurrence of each letter and armed with a statistical knowledge of the most common letter in the language used, which is E in English, we can have a pretty good stab at decoding a message.

A modification of this technique is to look for common two and three letter groups as they have a high probability of being words like IS, IT, AND and THE.

How our radio society helps amateur mobile operators are very strange things to write, but this is yet another code. Look at the first letter in the first 7 words! Another code would be

1, 2, 3, 4, 5, 6, 7, which says the same thing. Conversely try 6, 3, 8, 9, 10, 11; this may be true!

Codes have been discovered which were based on the American Constitution, however it is not possible to accurately decode them due to changes in spelling of the text that have been made over the years; only by knowing the precise issue can one extract the message.

Codes are also used to enable the reception of satellite television. One of the best known in this country is the Sky analogue system, where each television line is cut at a pseudo-random position and rotated, so all you could see was black and white lines flashing on the television. Every second, a 56-bit number was sent to the Videocrypt decoder, which converted it to an 8-bit number.

This number became the seed to a random number generator to reconstitute the video in the correct order. Cracking the codes became quite common and the Internet was used to distribute PIC software to re-enable your pirate card until such time as the coding scheme was changed.

# *A few notes from the Channel Tunnel.*

The last car onto the return train from Calais has the good fortune to meet one of the guards before the train started off and he spent the entire trip telling us all sorts of interesting things about the trains.

The tunnel is not in a straight line but has numerous gentle curves as the cutting was done along paths of least resistance. Our carriages were ten years old, and are driven from 25kV. Above our heads ( we were on the top deck ) was 6 inches of insulation. Braking energy is sent as power back into the catenary to reduce the electricity bill. Each train has a peak power of about 5 MW.

As a train moves through the tunnel, it compresses the air to the extent it would damage ear drums, hence double glazing and 6 large pistons evenly spaced. The piston sucks high pressure air from in front of the train and feeds it back behind a train going in the opposite direction, if there is one! If not, you can detect the air pressure

changes as if feels a bit like aircraft pressurisation. The pistons improves also efficiency.

There are three trips in each direction per hour at the moment; this rises to 4 trips per hour in peak season. This equates to 20 or 15 minutes between each train. However there are many more trains using the tunnel such as the passenger Eurostar service from Waterloo.

In fact the separation is about 2 minutes, which is 2.5 times the stopping distance. We were told that trains could stop on a sixpence, which is the reason vehicles are packed in with only a few inches between bumpers. It is not to pack more punters in!

We asked if the French enjoyed the trip to Waterloo station!

There was a very bad fire where a lorry caught fire and many lessons were learnt.

Now lorry drivers move to a separate carriage for the journey. Maintenance is done by

both employees and other firms (if they have safety certification). All work has to be checked by tunnel inspectors before being signed off.

Each carriage has a multitude of sensors to detect fires, flashes and they also sense gases. Heat resistant doors will hold back any fire for at least half an hour. Some new trains are coming into

service with 7MW power. This is 10,000 horsepower. A Horsham to Clapham junction train has ammeters which display up to 3200A, so with 400V we can calculate 1.2MW peak power.

That very nicely rounded off our dx-spedition. It is a pity the real train buffs forgo the opportunity of stocking up with last-minute alcohol and missed this!

## *AFS Contest*

Is that a cheer I hear? It must be the AFS contest in the horizon!

I'm sure all of you have been crossing off the days 'til this fantastic event but for those of you who don't know the exact number of hours until the contests begin I have taken an extract from the RSGB contest calendar, and corrected it.

AFS CW 11/01 14:00-18:00  
AFS SSB 17/01 14:00-18:00

The RSGB appear not to be able to organise the proverbial. They advertised the SSB contest as being on the 18<sup>th</sup> in the calendar yet a) it is usually on a Saturday and b) when I read the accompanying text they said

it was on the 17<sup>th</sup>.

Now I've given you all something to look forward to after the festivities I expect everyone to dust off their Morse keys and support the club on the 11<sup>th</sup>. As lots of stations who haven't previously been able to take part will be around this year should be extra fun and very interesting.

Don't forget to email results to G3ZBU@hotmail.com – there may be a special prize from the Newly Appointed (Ex Officio) Contest Manager (me! Hee hee) to the best score within the club so get stuck in there!

73 & 88 Helen Watt M0DEY  
Contest Manager